

Technical Review Special Edition: Shipbuilding and Ocean Development

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Welcome to the special edition of MHI Technical Review featuring our Shipbuilding and Ocean Development.

In October 2013, Mitsubishi Heavy Industries, Ltd. (MHI) restructured its operational segments based on specific business domains. The current four-domain structure allows us to cultivate new business areas and to offer new value-added products in order to achieve a greater market presence and play a significant role in global advancement.

The shipbuilding and ocean development industry has experienced a slump in global demand for new ships due to oversupply. The markets remain challenging as current weak demand and low prices are expected to continue. However, MHI's Shipbuilding and Ocean Development Division remains committed to bringing significant benefits to our clients' business development through our range of unique, high-value products that fully incorporate the strength of our long-established shipbuilding technologies and the Group's comprehensive development capabilities.

Our operations are based in two locations: two subsidiaries launched in October 2015 at the Nagasaki Shipyard handle construction of LNG and LPG carriers, while the Shimonoseki Shipyard handles construction of domestic passenger ferries and special-purpose high-performance vessels such as research ships. Both shipyards offer our clients vessels with high-added-value and superior technologies. Furthermore, MHI's expertise in cruise ship construction is fully utilized in its passenger-focused ROPAX ferries. With a plan to aggressively pursue business in European markets, this passenger-focused area is expected to be a key shipbuilding operation for the MHI Group.

This special edition features 11 new technologies and products as examples of our division's recent achievements and introduces the new group subsidiaries set up at the Nagasaki Shipyard.

We have developed Sayaringo STaGE, a next-generation LNG carrier with high economic performance, low environmental load, and superior versatility, developed specifically to meet the ongoing increase in LNG demand. As the production capacity of North American shale gas improves due to technology innovation, the need to transport gas to the Japanese market is expected to grow. Features of this new LNG carrier, such as new non-spherical, apple-shaped tanks that significantly increase LNG carrying capacity compared to earlier spherical tanks, continuous covers over the tanks, and the energy-efficient STaGE (steam turbine and gas engine) propulsion plant are introduced. Also discussed are the LNG supply chain and floating production infrastructure.

As for the energy-efficient RoPax ferry technology, we highlight our new large-size RoPax ferries, the first to be equipped with a dual hybrid propulsion system with an SGM (shaft generator motor), and another with a hybrid propulsion system, main propeller directly driven by two diesel engines and two electric-drive azimuth propellers besides the main propeller.

Regarding environmental protection technologies, we introduce the construction and installation of a wind turbine floater system for Fukushima floating offshore wind farm demonstration project, onboard testing of UE engines with low pressure EGR compliant with IMO NO_x Tier III regulations, and development and onboard testing of a marine SO_x scrubber system compliant with the IMO SO_x emission regulations.

Concerning fundamental development technologies, we feature our high-precision estimation technique for ship hull flow fields using numerical simulation, as well as prediction technology for underwater noise radiation of propeller tip vortex cavitation.

Also discussed as contracted engineering projects are a new 11,000 GT-class RORO (roll-on/roll-off) cargo ship and a 7,000-car class post-Panamax PCTC (pure car/truck carrier), both conceptually designed by MHI and further developed and constructed at a shipyard of MHI's partners.

We conclude this edition with introductions to the new subsidiaries: Mitsubishi Heavy Industries Shipbuilding Co., Ltd. and Mitsubishi Heavy Industries Hull Production Co., Ltd.

While working towards creating a new business scheme for shipbuilding, MHI's Shipbuilding & Ocean Development Division is also dedicated to the ongoing development of new products and technologies to satisfy ever-changing market and social needs. We deeply appreciate your ongoing support and guidance in our pursuit of excellence.