Ship & Offshore Structure

Main Products

- LPG carriers
- LNG carriers
- Bulk carriers
- Jetfoils
- Submarines

Ichiro Kono
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Ship & Offshore Structure Company

Vision

A shipbuilding and offshore structure engineering group pursuing innovation in cutting-edge fields with a focus on hydrogen technologies and low-temperature, high-pressure gas technology, submarine technology, and overseas projects.

Opportunities

- Increasing demand for vessels with low environmental burden due to tightened environmental regulations
- Recovery in carrier demand owing to growing demand for LNG and LPG
- Greater automation using IoT and AI
- Expanding operations to meet needs for an increasing fleet of submarines

Risks

- Increasingly fierce competition with China and South Korea
- Prolonged slump in shipping market
- Stalling of business talks due to the COVID-19 pandemic or prolonged slump in fuel prices

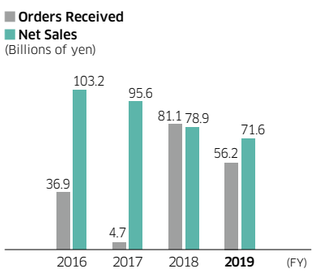
Core Competence

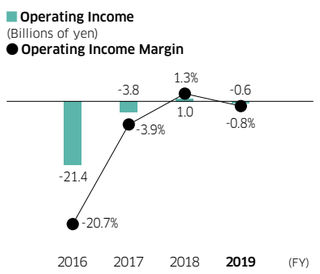
- Low-temperature and high-pressure gas-related technologies accumulated through the development and construction of LNG and LPG carriers
- Quality and cost competitiveness of the overall Group, including Chinese joint ventures (NACKS, DACKS*)
- Energy-saving, environmental burden-reducing technologies, and ability to develop new ship designs
- Sophisticated technology specific to submarines

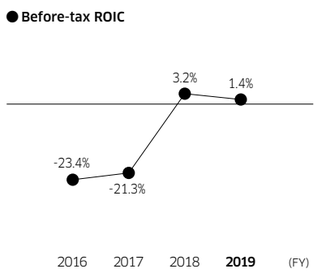
* *NACKS, DACKS: Shipbuilding joint ventures established in Nantong, Jiangsu Province and Dalian, Liaoning Province, with China COSCO Shipping Corporation Limited (China COSCO)*

Business Direction

- Integrated operation of the Sakaide Works, NACKS and DACKS
- Accelerate new product development and commercialization
- Steadily advance liquefied hydrogen carrier development







Operating Environment and Strategies

For two years—fiscal 2015 and fiscal 2016—this business segment booked sizable losses, prompting structural reforms led by the president. While the submarine business has been steady, the merchant ship business has faced a harsh operating environment reflecting excess construction capacity worldwide as well as a confluence of aggressive price competition by large shipyards in China and South Korea and stalled business negotiations due to uncertainty about the global economic outlook caused by the COVID-19 pandemic.

However, as environmental regulations continue to tighten going forward, demand for gas-related vessels, an area of strength for Kawasaki, is expected to increase. Kawasaki will continue to focus on gas-related vessel building, reinforcing its engineering capabilities and advancing business operations centered on integrated operations with its joint ventures in China to improve profitability. In addition, we will pursue the development and sales expansion of our ship operation and performance analysis support system (SOPass), which combines ship-related knowledge accumulated by Kawasaki with big data technology, as well as our fuel gas supply systems (FGSSs), which leverage our gas-related technologies. Furthermore, we will accelerate the development of large commercial liquefied hydrogen carriers.

In the submarine business, we will reinforce our R&D framework, aiming to secure orders for next-generation submarines. At the same time, we will apply our accumulated wealth of submarine-related technologies to the development of such products as autonomous under water vehicles (AUVs).

Initiatives to Create Social Value

The Ship & Offshore Structure Company is contributing to environmental conservation by promoting the spread of LNG-fueled ships and developing and building large hydrogen-fueled liquefied hydrogen carriers. Compared with heavy oil, the use of LNG enables substantial reductions in emissions of atmospheric pollutants, such as nitrogen oxide (NOx) and sulfur oxide (SOx). By developing and building a variety of LNG-fueled vessels, we are helping to meet NOx and SOx emissions regulations for ships to prevent air pollution over the sea. Furthermore, we are providing our LNG-fueled propulsion systems for ships constructed by other shipbuilders, and working to commercialize FGSSs to promote the operation of environmentally friendly LNG-fueled vessels around the world. We are also developing high-capacity liquefied hydrogen carriers. As hydrogen emits no CO_2 when used as fuel, it is the ultimate in clean energy. By commercializing the world's first ships that can economically carry large volumes of hydrogen, Kawasaki will promote the spread of hydrogen energy and contribute to the realization of a CO_2 emission-free society. In addition, we are developing hydrogen-fueled ship propulsion systems.

Goals for fiscal 2021	• Complete construction of a small liquefied hydrogen carrier (pilot ship) • Complete the development and commercialization of FGSSs • Receive multiple orders for LNG-fueled ships • Receive orders for FGSSs
Fiscal 2019 Results	• December 2019: Developed LNG dual-fuel system for medium-sized tankers, and for a tanker built by another company using this system received approval in principle (AiP) • December 2019: Launched a small liquefied hydrogen carrier • March 2020: Installed a liquefied hydrogen storage tank for marine transport on the small liquefied hydrogen carrier

Liquefied hydrogen carrier

Jetfoil