Prefatory Note

Introduction to the Special Feature on "CCS (CO_2 Capture and Storage)"

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On the occasion of the publication of ClassNK Technical Journal No. 12, I would like to extend a warm welcome to all our readers.

ClassNK Technical Journal is a technical publicity journal which is published with the aim of contributing to the progress of technology in the maritime industry by providing information on the technological activities and research achievements of ClassNK to a wider audience. The previous issue (ClassNK Technical Journal No. 11) reported on technological trends and the latest results of research and development related to the theme of lectures at the ClassNK R&D Forum held in January 2025, "Towards Safer and Environmentally Friendly Ships."

In recent years, there has been a rapid increase in interest in onboard CCS/CCU (Carbon dioxide Capture and Storage/Carbon dioxide Capture and Utilization) technology as a means of reducing CO_2 emissions from ships, towards achievement of the goal of "aiming for net-zero emissions of GHG by around 2050 at the latest" set by the International Maritime Organization (IMO). However, how the reductions achieved by using those technologies are treated in the GHG emissions reduction regulations of the EU and IMO will have a substantial impact on the adoption of the technologies. Therefore, this Special Feature presents an overview of latest related regulatory trends and status of issues regarding the development of storage infrastructure, which will be essential for achieving this goal. In addition, related to onboard CO_2 capture and storage technology that can be implemented on the ships, a technical commentary is provided on revisions to the ClassNK Guidelines issued in October 2025, adds new requirements related to the membrane separation method for CO_2 capture.

Meanwhile, the Japanese government as a whole set a target of realizing carbon neutrality by 2050, and is implementing initiatives to reduce CO_2 emissions. As part of the CCS technology necessary to achieve that target, this Special Feature includes papers by outside experts on the formulation of common guidelines for low temperature/low pressure ship transportation of liquefied CO_2 (LCO_2) and the related value chain, and the development of an LCO_2 ship transportation technology as a safe, low cost means of transporting CO_2 based on the guidelines, and a long-distance transportation demonstration test between Maizuru (Kyoto Prefecture) and Tomakomai (Hokkaido) using the demonstration ship "EXCOOL".

Finally, this Special Feature on "CCS (CO_2 Capture and Storage)" also presents a commentary on technologies related to large-scale CCS facilities and onboard CO_2 capture equipment from a private-sector company which has record of about 30 years in the development of CO_2 capture technologies and actual operational results of 18 land-based CO_2 capture plants, including the world's largest.

Other topics in this issue include recent trends in international conventions, etc. such as the IMO's interim GHG reduction measures, as well as recent technological trends in the safety of work vessels used in offshore wind turbine construction and MASS (Maritime Autonomous Surface Ships), which were the subjects of lectures at the ClassNK Technical Seminars held in October and November 2025.

Until now, ClassNK has devoted its efforts to the creation of “good ships” as its highest-priority issue. However, in addition to that goal, in the future we will also endeavor to contribute to the future progress of the maritime industry through diligent efforts in research and development that contribute to securing the safety of life and property at sea, preservation of the marine environment, and the creation of innovations that will lead society based on the needs of society and the industry, also including the viewpoints of “good management” and “good operation.”

In closing, we sincerely request the continuing understanding and support of all those concerned in future, as in the past.