

No Growth Without Safety

Safety

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Governance

Strategies and Risk Management

- Encouraging and Expanding Safety Culture
- Original Safety Standard "NAV9000"
- Safety Campaigns
- DX that Supports Safe Operations
- Risk Management

Target and Progress

Minimizing Fleet Downtime

Initiatives

- Safety on Sea
- Safety on Land
- DX that Supports Safe Operations

Co-creation through External Parties

- Autonomous Navigation Technology R&D
- Promoting Innovation in the Maritime Industry
- Introduction of Equipment That Suppresses Hull Shaking to Enable Safe and Efficient Cargo Handling

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Ensuring safe operation of the vessels is the foundation of the NYK Group's business activities and the top priority for ESG management.

In the NYK Group, to instill the idea of "safety underpins trust and that trust underpins business" in each business division and even at the field level, the "Safety and Environmental Management Committee (SEMC)" chaired by the President is the Company's highest decision-making body for safety measures and environmental issues focused on thoroughly instilling safety awareness.

With safety being a top priority (material issue) for the NYK Group, the SEMC is led by the President, who is also the CEO of our Group, as the chairperson, and includes the Vice President, two Senior Managing Directors, five Managing Directors, and Executive Chief of Environmental Management. The concerned parties in Japan and overseas, both onshore and offshore, will continue to collaborate to advance safety-related initiatives.

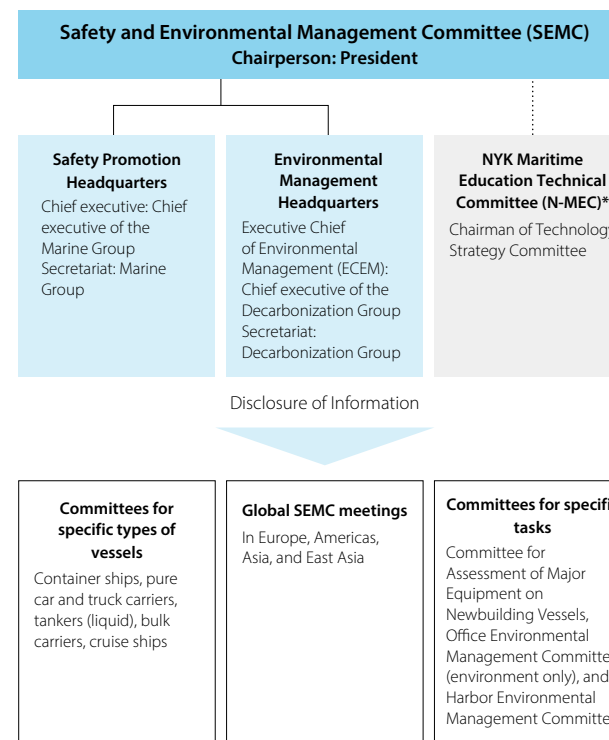
As specific measures, we have continued to implement safety promotion activities based on the PDCA cycle such as discussion meetings between the President and captains, major emergency response exercises, vessel visits, and NAV9000 activities. As a result, our Group demonstrates the highest standards of technology, leveraging abundant knowledge and experience under a strong safety awareness at each site.

Every year, the SEMC reviews the activities conducted the previous year and decides the activity policy and goals for the current year. Also, the activity policy decided by the SEMC is translated into specific activities by the sub-committees for each vessel type and executed as safety enhancement activities for each vessel.

Our Group will continue to invest time and efforts in ensuring complete operational safety in order to remain an organization

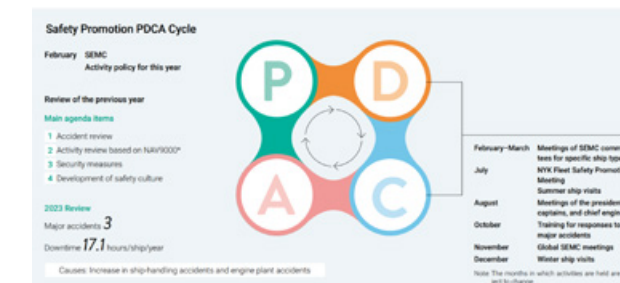
where people create safety, which protects and nurtures people's lives.

Safety and Environmental Measures Advancement System



*Committee for education, training, and development of crew members

Safety promotion PDCA cycle



Strategies and Risk Management

Encouraging and Expanding Safety Culture

The NYK Group continues to pass on to the next generation the lessons we have learned from past major accidents are not forgotten. We strive to raise safety awareness and deepen the knowledge within the NYK Group and among partner companies and vessels through various measures, including developing personnel who are safety-conscious, visiting vessels to acquire insights from past serious accidents, and carrying out on-site activities based on our unique safety standard, "NAV9000".

Moreover, we are developing activities to promote two-way communication, such as e-learning created based on reenactment videos, which is being taken by land and sea staff, in an effort to foster a safety culture.

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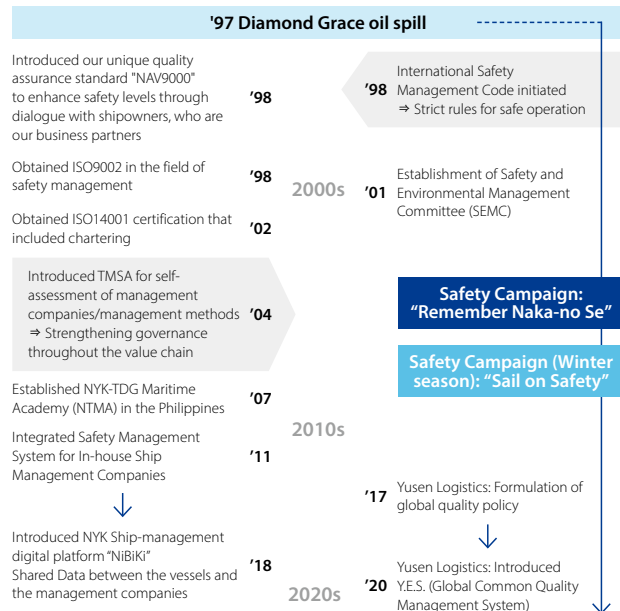
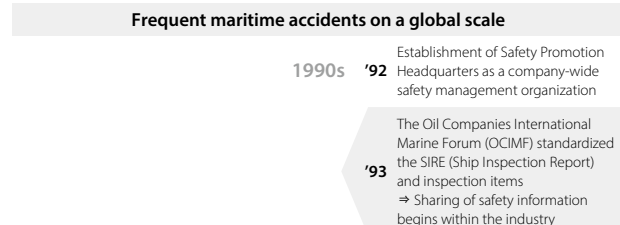
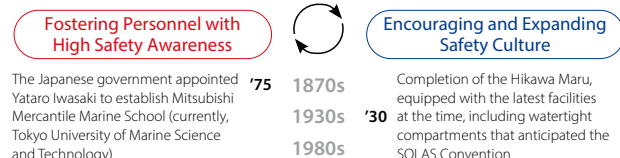
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Pursuit of Safety - History

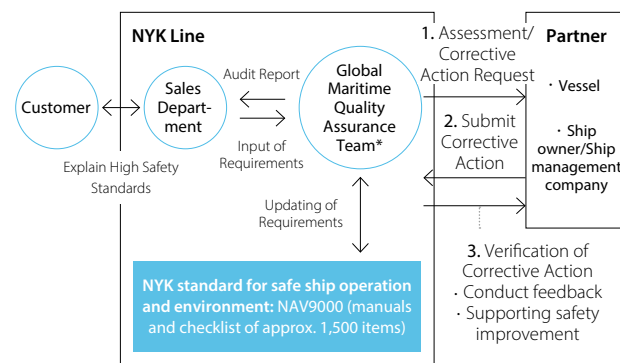


Original Safety Standard "NAV9000"

Since 1998, the Group has been conducting safety promotion activities based on "NAV9000" that is an original safety standard of NYK.

This original standard is aimed at meeting responsibilities to ensure the safety of human life and safe ship operations and to protect the environment. The standard covers approximately 1,500 items, including international regulations, industry standards, and industry good practices and measures that NYK has accumulated to prevent accidents from recurring and to ensure that customers' requirements are met.

Overview of NAV9000



*Global Maritime Quality Assurance Team, Marine Group, NYK Headquarter

The NAV9000 standards have been applied to all of the approximately 700 vessels in operation. Assessments based on these standards are conducted on approximately 200 vessels and at about 20 shipowners and ship management companies per year. The audits are used to implement corrective actions and improvement measures, and then evaluated and reviewed in a

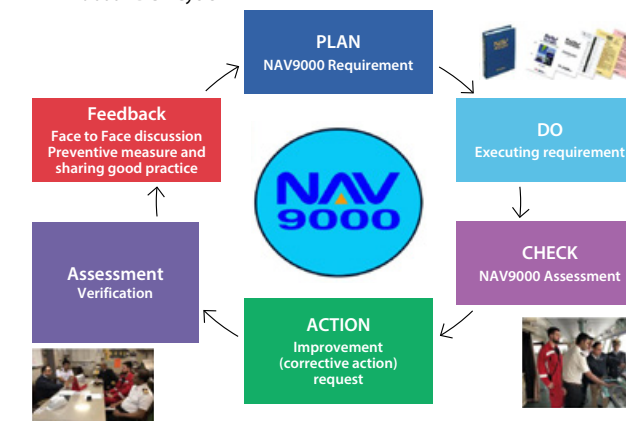
PDCA cycle to ensure safe operation.

Furthermore, NAV9000 safety promotion activities have been accredited on ISO9001 by ClassNK.



Certificate of Quality Management System Registration

NAV9000 PDCA Cycle



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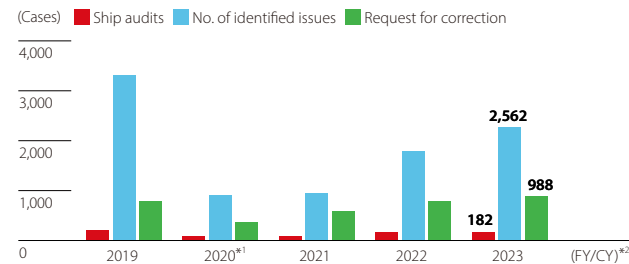
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● NAV9000 Assessment Focusing on Dialogue

In NAV9000 assessment, we emphasize face-to-face dialogue with seafarers and ship management companies, i.e., our partners. Our employees visit the vessels in operation, shipowner offices, shipowners, and ship-management companies to communicate face to face with seafarers and company personnel about safety information, customer requirements, the latest industry standards, and other matters. We also share our experiences as the Group to implement highly effective measures. Moreover, we evaluate safety levels through site inspections by our Group assessors* and maintain strong partnerships with everyone involved by working together to enhance safety culture, thereby achieving a high level of safety management.

*Assessors are as Master/Chief Engineer in NYK Group who have completed an external body's ISO9001 auditor training course (Japanese, Indian, Filipino, etc.)

■ NAV9000 Track Record



*1 From April 2020, ship audits were postponed due to COVID-19. From 1 August 2020, ship audits (i.e., the NAV9000 e-Audit) were restarted remotely.

*2 From 2020, the calendar year (CY) is used instead of the company's fiscal year (FY). Thus, January-March 2020 data contained in FY2019 is also included in CY2020.

Safety Campaigns

To conduct and deepen safety enhancement campaigns as part of the NYK Group's corporate culture, we conduct ship visits as a part of our safety campaigns every summer and winter.

Summer season "Remember Naka-no-Se"

To learn from the oil spill incident that occurred on July 2, 1997, at Naka-no-Se shoal in Tokyo Bay on the crude oil tanker, Diamond Grace, employees of group companies and the crew members of the vessel have reaffirmed the importance of safe operations for two months every year starting in July from 1998 onwards.

Winter season "Sail on Safety"

Winter campaigns are held for two months every year starting in December, mainly focusing on preventing marine accidents, including those resulting from rough winter weather.

During the campaign period, many executives and employees visit vessels to talk directly with crew members about safety. Moreover, NYK creates opportunities for further discussion with representatives from shipowners and ship management companies to get its safety activities to the frontline of ship operations. In 2023, 565 executive officers and employees from Japan and overseas visited the ship, significantly more than the previous year, combining face-to-face and online visits.

Moreover, NYK strengthens its culture of safety through various materials, such as the company's "Casualty Report" for flash reports about accidents, "Safety Bulletin" for strategies to prevent accidents and problems, "Marine Engineering Information" for technical matters, and "Security Information" for security issues.

DX that supports safe operations

We aim to make vessel operations safer by promoting "DX that supports safe operations" initiatives such as using digital technologies and analyzing collected data for solving the various issues faced in the field. We also promote next-generation autonomous navigation technology R&D.

For more information, click the link below

[P.024 DX that supports safe operations](#)

[P.026 Autonomous Navigation Technology R&D](#)

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Risk Management

We regularly identify and evaluate risks at the Risk Management Committee (convened twice a year). We recognize that operational risks, such as major ship accidents, can have a significant impact on the business of the NYK Group. We also recognize other industrial safety and health-related issues as risks, and have created a risk map that categorizes issues based on their impact on management and frequency to identify the current level of risk and where potential risks lie.

We have prepared operational risks in several ways using NAV9000, from promoting safety to preparing for marine accidents.

For more information, click the link below

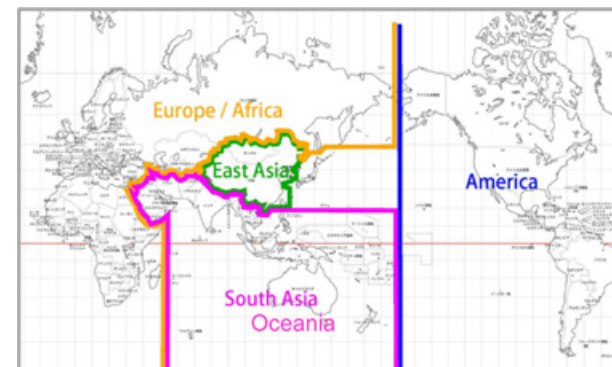
[P.126 Enterprise Risk Management \(ERM\)](#)

● Marine Accident Readiness

> Emergency Response Network

The Group has created an emergency response network as part of the Safety and Environmental Management Committee (SEMC) to be ready for maritime accidents and problems in any ocean area around the world.

■ Global SEMC Jurisdiction Area Map



> Continuing Serious Emergency Response Drills

We conduct regular emergency response drills to ensure a swift response in the event of an accident.

In September 2023, we conducted a drill simulating a serious accident in which one of our LNG carriers collides with a passenger ship outside Ise Bay. The drill covered a range of measures, such as quickly setting up an accident response headquarters, rescuing passengers lost overboard from passenger ships, coordinating with external parties to ensure the safety of nearby ships, disclosing appropriate information as the situation develops, and holding press conferences, providing an opportunity to reaffirm our preparedness for serious marine accidents.

This serious emergency response drill is held once a year with the cooperation of many external parties, including operating ships and ship management companies, government agencies such as the Ministry of Land, Infrastructure, Transport and Tourism and the Japan Coast Guard, the Japanese Shipowners' Association, and customers.



Scene at the Accident Response Head Office

Scene at the mock press conference

● Ship Cyber Risk Management

Regarding cyber-risk management for ships, the International Maritime Organization (IMO) approved "Guidelines on Maritime Cyber Risk Management" at its 98th Maritime Safety Committee (MSC98) meeting in June 2017 and strongly recommended that a shipboard cyber-risk management system be put in place from January 2021 onward. The shipping industry has considered this recommendation to be a de facto mandate, and the NYK Group has been actively responding to introduce such a system.



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In addition, in April 2022, the International Association of Classification Societies (IACS) adopted two new unified requirements (UR E26 and E27) on the cyber resilience of ships. These new URs will require more robust cybersecurity measures for new ships from July 2024 onward. The NYK Group is also actively involved in discussions on the formulation of international rules, such as those at the IMO, and is strengthening cooperation with relevant organizations.

The NYK Group has been working with Dualog, a Norwegian maritime IT company, to develop a cybersecurity response system for ships. Installation on vessels began in September 2022, and in cooperation with our existing land-based security operations center, we have also been working to build a comprehensive monitoring and early response organization.

● Ship Safety Risk Response

In the NYK Group, Safety and Security Management Team, Marine Group is responsible for safety and crisis management for vessels operating around the world. Based on information collected from relevant parties and in cooperation with safety management officers assigned to each business division and major ship management companies, we determine operational risks, propose countermeasures, and give instructions to ships.

In the event of an emergency such as an international conflict* or piracy, an emergency response headquarters, headed by the President and CEO, will be immediately set up in the Crisis Management Center (CMC) within the head office to respond to the situation.

*Including missile launches and terrorism by North Korea

Target and Progress

The Group has set "zero serious accidents" as a non-financial indicator based on the material issue of "safety," and is working towards achieving the target while monitoring the figures.

We also monitor important figures and initiatives related to safe operation, such as delay times and various ship information, and analyze the results to improve safety and further strengthen our initiatives.

■ Number of major accidents

Material Issues	Target	2021	2022	2023
Safety	Number of major accidents: 0 event	1	2	3

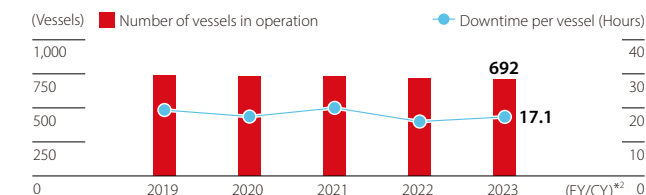
(Cases)

Minimizing Fleet Downtime

The Group uses the downtime that ships are stopped due to accidents or problems (downtime*) as a means of measuring the degree to which we have achieved safe ship operation. All our employees work toward to the target of "10 hours or less" downtime per vessel.

*1 Downtime: The total duration in which vessel service has stopped due to a collision, grounding, engine accidents, etc.

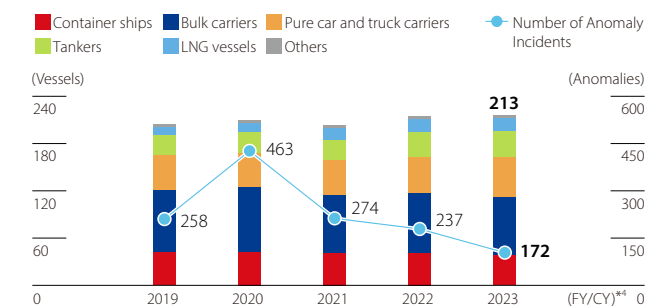
■ Downtime Data



*2 From 2020, the calendar year (CY) is used instead of the company's fiscal year (FY). Thus, January-March 2020 data contained in FY2019 is also included in CY2020.

As one means of achieving the goal of "10 hours or less" downtime per vessel, the Group has conducted research into predicting and preventing ship equipment failures through the use of IoT and big data, and we have a system that enable onshore personnel to also support safe operations. We are currently analyzing abnormal values in data collected by SIMS to monitor the risks of ship engine accidents and dragging anchors.

■ Number of SIMS³-equipped Vessels and Number of Anomaly Incidents



*3 SIMS (Ship Information Management System): SIMS allows us to monitor in real time detailed data during navigation, starting with data from engines and all kinds of equipment through to vessel speed and vibration, as well as weather information like wind speed and tidal currents. All the data is shared between vessels and worksites onshore.

*4 From 2020, the calendar year (CY) is used instead of the company's fiscal year (FY). Thus, January-March 2020 data contained in FY2019 is also included in CY2020.

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Safety on Sea

• Near Miss 3000 Activities

Our Near Miss 3000 activities aim to prevent accidents before they happen. These activities based on Heinrich's Law^{*1}, and deal with the often over-looked precursors to accidents. Under the slogan "DEVIL Hunting!"^{*2}, since 2006 the Group has been working with partner shipowners and ship management companies to advance activities that are aimed at nipping accidents in the bud.

In these activities, our goal is to create environments that are safer and easier to work in by increasing crew members' safety awareness. Through the consistent performance of routine duties with an awareness of safety, crew members help prevent collisions, equipment breakdowns, and accidents during work.

^{*1} Heinrich's Law:

A theory by William Herbert Heinrich, a safety engineer working at an American casualty insurance company, that in a workplace, for every accident that causes a major injury, there are 29 accidents that cause minor injuries and 300 accidents that cause no injuries.

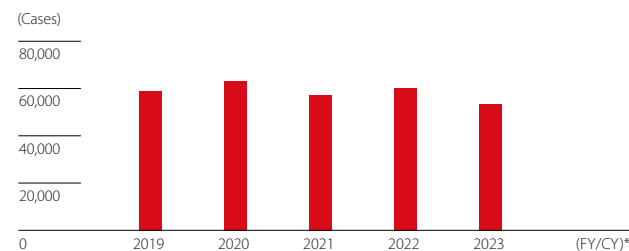
^{*2} DEVIL Hunting!:

"DEVIL" is derived from "Dangerous Events and Irregular Looks". The purpose of these activities is to eliminate at the very early stages the precursors and factors to accidents before a major event occurs.



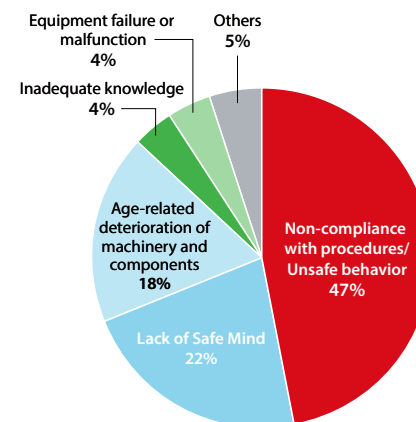
Near Miss 3000 Activities "DEVIL Hunting!" poster

■ Number of DEVIL Reported



^{*}From 2020, the calendar year (CY) is used instead of the company's fiscal year (FY). Thus, January-March 2020 data contained in FY2019 is also included in CY2020.

■ Calendar 2023 DEVIL Causes



• Offshore-onshore information sharing via "Calm Sea"

Up-to-date information, such as the achievement rate of safe operations, examples of Near Miss 3000 activities, lessons learned from the accidents, and environmental measures are notified to the shipowners, ship management companies, and all operational vessels via the monthly newsletter "Calm Sea," and information is shared between onshore and offshore personnel.



The Monthly Newsletter "Calm Sea"

• NYK's Activities to Promote Safe Operation of Crew Transport Vessel (CTVs) for Offshore Wind Power Generation Certified by ISO

In August 2023, we received ISO 9001:2015 certification, the international standard for quality management systems, from Nippon Kaiji Kyokai (ClassNK) for its activities to promote the safe operation of its crew transport vessel (CTV) for offshore wind power generation.

In addition to the safety management system set up by the ship-management company, we implement NAV9000 activities that promote safe operation based on our own safety standard NAV9000, which has been certified by the International Organization for Standardization (ISO), to achieve an even higher level of quality control and safe operation.

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• Safe Cargo Operation Guidelines for Bulk Carriers

In the dry bulk business, we are using "Essential-15" safe cargo handling guidelines for high quality transport, and are working to raise awareness and deepen knowledge of safe cargo handling. The "Essential-15" safe cargo operation guidelines summarizes 15 items ought to be considered to be indispensable for safe cargo operations. Officers of capsize and panamax bulk carriers, among other bulkers, make use of the guidelines to prevent serious accidents during cargo handling. As of June 2024, we have already distributed the guidelines to a total of 210 bulk carriers operated by our Company through shipowners and ship management companies.

In addition to being available in four languages (English, Japanese, Chinese, and Tagalog), the change from traditional paper media to digital media, including animation, has also been a success, widely spreading from ship captains and navigation officers, whose knowledge and experience levels and native languages differ, to operators, and contributing to the revitalization of communication between seafarers and shore-side personnel.



safe cargo operation guidelines

Safety on Land

• Automotive Business Division Initiatives - Global SQC (Safety & Quality Committee)

In the automotive business sector, high quality and safe transportation has been our top priority throughout its half-century history. On pure car and truck carriers, unpacked cars are loaded and unloaded by stevedore drivers, so workers are required to be careful about car-handling such as driving, opening/closing doors, direction, signaling, and lashing to avoid even the slightest scratch. Therefore, to ensure optimal safety and quality control, stevedore companies, foreman, and all other relevant parties on working site have to work together with NYK staffs.

Our group has established Global SQC (Safety & Quality Committee)* both in Japan and overseas to improve safety and quality.

*Global SQC (Safety & Quality Committee): A committee for the purpose of improving safety and quality, consisting of six Regional SQCs: Japan, Americas, Europe, China, Asia/Oceania, and Pan-Indian Ocean Regions with the concept of three pillars include not only cargo quality, but also fleet quality and operation quality. As part of our activities, we regularly hold regional and general meetings to share our philosophy and exchange opinions/workshops to prevent accidents to people involved in automotive transportation in Japan and overseas.



Group photograph of Global SQC meeting participants

DX that supports safe operations

• Ship Performance Management System "SIMS"

To support safer and more efficient vessel operations through the use of ship data, the Company introduced the Ship Information Management System (SIMS) in 2008 to share detailed hourly operational status and fuel consumption data among ships and land-based vessels in a timely manner.

We upgraded to the third generation "SIMS3" from 2020, and are proceeding to install it on our own vessels from 2021. With SIMS3, the granularity of data transmission intervals has increased to every minute, enabling more precise data acquisition. The number of vessels equipped with SIMS3 is approximately 98 as of the end of June 2024 out of 200 vessels or more equipped with SIMS.

In addition to visualization of vessel information, SIMS3 enables early detection of engine anomalies through data analysis on a land-based server, and contributes to the establishment of a remote supervision system through the Remote Diagnostic Center (RDC).

Currently, we are promoting the installation of necessary sensors to detect abnormalities in a higher dimension by further expanding the scope of monitoring, reducing serious accidents and maintenance costs, and reforming work styles to reduce the workload of crew members.

As the amount of data shared between onshore and offshore increases, the Maritime IT Committee, which combines maritime engineers and DX expertise, has been established to strengthen cyber security in order to enhance safe operation on the digital side, such as IoT data monitoring and cyber risk monitoring on land. The Maritime IT Committee is working to strengthen cyber security.

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One-minute interval data enables detailed verification in real time when anomalies are detected or troubles occur.

• (Vessels) Ship management platform "NiBiKi" for sharing information between onshore and offshore

The NYK Group has developed and established a platform for sharing data of Ship Management Companies called "NiBiKi." The service has been in operation since December 2018.

By utilizing the NiBiKi system, which digitizes 'SMS Manual and Circulars' and the applications and approval workflow. This enables the seafarers to reduce their workload by simply filling out prescribed forms for accurate reporting and approval requests. These actions are also recorded along with the name, rank, and time stamp of the person responsible, increasing the reliability of the information since it cannot be tampered with.

In June 2023, we partnered with a ship valuation and rating company, RightShip to develop a system that allows partial integration with their data platform. This is expected to greatly improve operational efficiency in sharing data on PSC* inspection results between shipowners, ship managers, and RightShip.

*PSC (Port State Control): Supervision of foreign vessels, which refers to on-site inspections of foreign vessels calling at ports

• (Operations Management)

Establishment of Remote Diagnostic Center (RDC)

As part of digital ship management, an RDC was established in August 2020 within NYK-Fil Maritime E-Training Inc. in the Philippines to monitor engine plant from shore for 205 vessels equipped with SIMS (as of September 30, 2023). RDC Experts analyze the abnormal behavior of engine data detected by anomaly detection systems in the light of their own knowledge and experience as marine engineers, to eliminate false positives in the system and select those that are truly suspected anomalies.

The results of the expert's analysis will be communicated to the vessel and the management company, contributing to the elimination of serious accidents and fuel savings for vessels operated by our Group.



Remote Diagnostic Center

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Autonomous Navigation Technology R&D

Advanced systems integration is essential for safe navigation, improved efficiency, and a reduction in crew workload. NYK, MTI Co. Ltd. (MTI), and Japan Marine Science Co. Ltd. (JMS) are openly collaborating with global players in the maritime industry and other industries, including the systems industry, to realize autonomous vessels equipped with systems having advanced processing capabilities that crew members can utilize.

● Fully Autonomous Ship Initiatives - Participation in MEGURI 2040

Since March 2020, the NYK Group has participated in "MEGURI 2040", a fully autonomous ship project promoted by The Nippon Foundation.

In the first phase, three group companies, that is, NYK, JMS and MTI jointly developed an unmanned navigation system with more than 30 companies and organizations, and in February 2022 succeeded in the world's first demonstration test of long-distance coastal navigation, including congested waters*, for a merchant vessel.

We are currently participating in the DFFAS Plus Consortium, which is implementing a successor program for the social implementation of crew-less vessels, together with The Nippon Foundation and 53 domestic consortium members. This program aims for the full-scale practical application of crew-less ship technology by 2025.

*Seas with extremely heavy vessel traffic

History of Automated Operation System Development

Month/Year	Business name	Details
Jun-16	Maritime productivity revolution (i-Shipping) (Ministry of Land, Infrastructure, Transport and Tourism (MLIT) Maritime Affairs Bureau Grant Project)	Four projects in which NYK and MTI jointly participate selected by MLIT for the "Advanced Safety Ship Technology Research and Development Support Project"
Dec-17	Maritime productivity revolution (i-Shipping) (MLIT Maritime Affairs Bureau Grant Project)	Partial release of "Research on Collision Risk Judgment and Autonomous Ship Maneuvering"
Jul-18	Joint research by Kobe University, MTI, and JMS (MLIT Policy Bureau Grant Project)	The "Development of a coastal ship maneuvering support system using artificial intelligence as core technology," a joint research project between MTI and JMS and Kobe University, has been selected for the MLIT's "FY2018 Transportation Technology Development Promotion System"
Sep-19	Verification test of automated operation	NYK succeeds in verification test of automated operation towards realization of world's first "Crewed Autonomous Vessel"
May-20	Automatic operation vessel verification test MLIT Maritime Affairs Bureau Commissioned Project	NYK, MTI, Keihin Dock Co., Ltd., and JMS succeeded in remote ship on-board test using a tugboat.
Dec-20	Joint research by Kobe University, MTI, and JMS (MLIT Policy Bureau Grant Project)	MTI and JMS conducted on-board testing of AI-based avoidance navigation research as part of the "Development of a coastal ship maneuvering support system with artificial intelligence as its core technology"
Nov-21	"Technology Development Support Project for Promotion of Maritime Industry Intensive Cooperation" MLIT Maritime Affairs Bureau Grant	Project for Evaluating and Verifying the Automatic Navigation System and Developing Element Technologies Started
Apr-23	"Technology Development Support Project for Promotion of Maritime Industry Intensive Cooperation" MLIT Maritime Affairs Bureau Grant	New Crewed Autonomous Navigation System Installed New Domestic Coastal Vessel "Shiranami" for JERA

Promoting Innovation in the Maritime Industry

Investment in fundamental big data technology and involvement in active development are indispensable for achieving safe, economical, and environmentally friendly operations. The Group will promote a safe and efficient onboard IoT platform, in addition to digitalization initiatives, for innovation with shipbuilding companies, equipment manufacturers, ship classification societies, and various partners.

- Establishment of Maritime and Ocean Digital Engineering Cooperation Program at the University of Tokyo
- Event held with Dualog, a Norwegian maritime IT company
- MHI to present at "Internet x Space Summit" to explore possibilities of space communications

Safety

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Governance

Strategies and Risk Management

- Encouraging and Expanding Safety Culture
- Original Safety Standard "NAV9000"
- Safety Campaigns
- DX that Supports Safe Operations
- Risk Management

Target and Progress

- Minimizing Fleet Downtime

Initiatives

- Safety on Sea
- Safety on Land
- DX that Supports Safe Operations

Co-creation through External Parties

- Autonomous Navigation Technology R&D
- Promoting Innovation in the Maritime Industry
- Introduction of Equipment That Suppresses Hull Shaking to Enable Safe and Efficient Cargo Handling

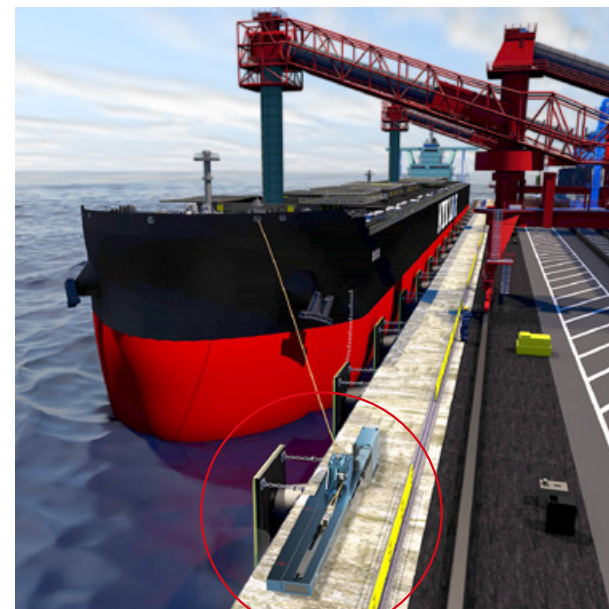
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Introduction of Equipment That Suppresses Hull Shaking to Enable Safe and Efficient Cargo Handling

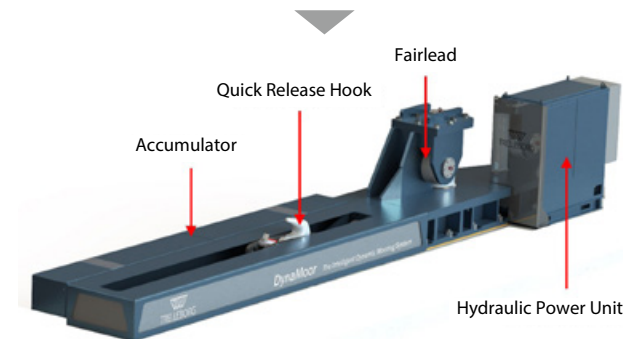
In harbors facing the open sea, vessels are prone to hull swings even while anchored, causing a variety of adverse effects. Furthermore, in recent years, as vessels have become larger, there has been a demand for further improvements in port safety and operating rates, making vessel swing control an urgent issue. To solve this problem, we are working with Trelleborg to collect performance data and verify the effectiveness of their vessel mooring equipment, "DynaMoor Type-L".

With the cooperation of our partners, we will continue to work to solve problems on-site at every stage of the supply chain, from transporting to spinning and unloading.

Overview of "DynaMoor"



Application image of "DynaMoor"



DynaMoor-L type