

Message from the President

Taking on the challenge of creating new value and staying ahead of our competitors with a focus on digital technologies and environmental initiatives



Tadaaki Naito

President, Representative Director
President Corporate Officer

Looking Back on Fiscal 2017 and the Previous Medium-Term Management Plan

Results improved across the board after implementing an emergency plan for withstanding the market slump and preparing for the times ahead

Back in April 2014, we launched our previous five-year medium-term management plan, More than Shipping 2018 — Stage 2: Leveraged by Creative Solutions. The Group achieved its financial targets in the plan's first year, but conditions in the maritime shipping market grew progressively worse, culminating in a perfect storm of negative factors in fiscal 2016. Consequently, the Group posted about ¥200.0 billion in extraordinary losses associated with business restructuring expenses, and abandoned the financial targets of the medium-term management plan. In response to the dramatic market downturn, we initiated a group-wide emergency plan called Beat the Crisis, which was created to deal with the market conditions of the day and build a business foundation for a new stage of growth. Over about two years of that initiative up until the end of fiscal 2017, we succeeded in cutting costs and improving the Group's financial structure. All members of the Group worked hard together with a shared determination to get through those tough times.

As a result of those efforts and the recovery of the maritime shipping market, consolidated financial results in

fiscal 2017 improved substantially compared with the previous fiscal year. The Group posted ¥2,183.2 billion in revenues, ¥27.8 billion in operating income, ¥28.0 billion in recurring profit, and ¥20.1 billion in profit attributable to owners of parent. Moreover, after suspending dividend payments in fiscal 2016, NYK resumed payments in fiscal 2017 with a fiscal year-end dividend of ¥30 per share.

Although we abandoned the financial targets of the previous plan, its asset strategy and business differentiation strategy did not lose their relevance, so we steadily pushed ahead with those basic strategies. We decided to integrate the Group's container shipping business with those of two other Japanese companies, and made Yusen Logistics Co. Ltd. (YLK) into a wholly owned subsidiary. Through such initiatives, the Group made progress toward building a business foundation for the next stage of growth. When confronted with such a challenging business environment in recent years, I believe that the measures taken by the Group's management were the most appropriate and effective, so we will continue following the core of our basic strategies in order to make further improvements and progress.

Basic Strategies of the Previous Medium-Term Management Plan and Measures Taken under the Beat the Crisis Emergency Plan

Reorganized the business portfolio

- Integrated the container shipping business with those of two other companies
- Made YLK into a wholly owned subsidiary
- Sold off a partial stake in a North American terminal business, and sold a U.S. cruise ship business and refrigerated cargo transportation business
- Secured new projects with potential for stable growth in the LNG, offshore, and automotive logistics businesses

Shifted to an asset-light business model in highly volatile businesses

- Sold and scrapped surplus dry bulk carriers
- Reduced the number of containerships under long-term contracts and shortened chartering periods

Differentiated services beyond conventional cargo transport services

- Began supplying and selling LNG fuel
- Developed next-generation logistics solutions by utilizing IoT technologies
- Improved fuel efficiency and practiced yield management in the container shipping business

Financial Results from Fiscal 2014 to 2017

(Billions of yen)

	Previous medium-term management plan	
	FY2014	FY2016
Revenues	2,300	2,500
Operating income (loss)	70	100
Recurring profit (loss)	70	120
Profit (loss) attributable to owners of parent	35	80
Return on equity (ROE)	5%	9%
Dividend payout ratio	25%	25%

(Billions of yen)

Results			
FY2014	FY2015	FY2016	FY2017
2,401.8	2,272.3	1,923.9	2,183.2
66.2	49.0	(18.1)	27.8
84.0	60.1	1.0	28.0
47.6	18.2	(265.7)	20.1
6.2%	2.3%	(41.0%)	3.8%
24.9%	55.8%	—	25.1%

New Medium-Term Management Plan Established in Response to the Operating Environment

We are determined to create new value and pursue innovative measures to stay ahead of our competitors amid a dramatically changing operating environment

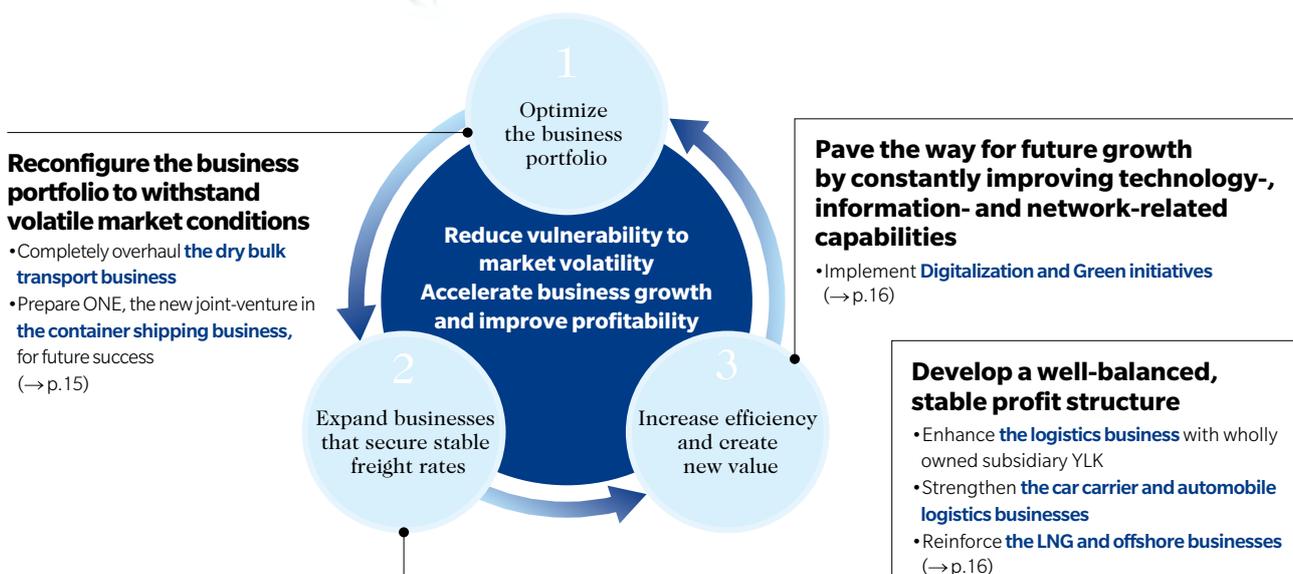
We created our new five-year medium-term management plan, which was announced in March 2018, with a view to effectively deal with the Group’s operating environment. Two external factors have a particularly large impact on the Group’s operations. The first is the volatility of the maritime shipping market. Although it is currently on a recovery path, speculative capital is being invested in the shipping industry due to excess liquidity in financial markets, and, consequently, oversupply of tonnage is a worrying possibility. Furthermore, currency exchange rates and bunker oil prices have been fluctuating dramatically over the past decade. For these and other reasons, the outlook for the maritime shipping market is very unclear. The second external factor is the political-economic environment, which has been changing in diverse ways. For example, trade protectionism is gaining ground, there is a movement toward local production for local consumption, and geopolitical risks are still causes of serious concern. Moreover, rapid advancements are being made with digital technologies, countries are shifting to

low-carbon economies, and environmental regulations are becoming stricter. To respond to all of these trends, we explored innovative ways for differentiating the Group’s businesses when formulating our new medium-term management plan.

We also redefined the NYK Group’s mission statement when deciding on the plan. That move was initiated by an outside director, who pointed out that the former statement’s focus on transporting cargo did not reflect the new businesses that we are developing, so it should be renewed along with the new plan.

Accordingly, we re-examined the Group’s core mission and fundamental goals, and created a new mission statement: “Bringing value to life”. It expresses the path that all of the Group’s businesses take, while also reflecting the original vision of the Company’s founder and our unwavering dedication regardless of the changing times and social trends. In line with this mission statement, we envisioned how the Group should be in 10 years’ time, and formulated four broad objectives for realizing that vision in

Basic Strategies of Staying Ahead 2022 with Digitalization and Green



our new medium-term management plan, Staying Ahead 2022 with Digitalization and Green. The phrase “staying ahead” in the plan’s name expresses our determination to

take on future challenges and outperform our competitors through innovation with a ceaseless pioneering spirit.

Basic Strategy 1: Optimize the Group’s Business Portfolio

Completely overhauling the dry bulk transport business and container shipping business with the goal of improving profitability

While generally following the approach of our previous medium-term management plan, we have set three basic strategies in our new medium-term management plan based on considerations of the Group’s business environment, as I described above.

The first strategy is to optimize the Group’s business portfolio. That means overhauling the dry bulk transport business and container shipping business over the next five years in an effort to establish an optimally structured portfolio. We are determined to improve the profitability of the dry bulk transport business, and, therefore, will proceed with restructuring regardless of the pain involved. Stable earnings can be generated by optimizing fleet composition based on cargo contracts, so we will proceed with bold measures for achieving those arrangements.

Meanwhile, we integrated the container shipping business with those of Mitsui O.S.K. Lines Ltd. and Kawasaki Kisen Kaisha Ltd. with a view to improve efficiency and benefit from a larger scale of operations. Ocean Network Express Pte. Ltd. (hereafter, “ONE”) was jointly established as an operating company in Singapore,

and began offering services from April 2018. We are highly committed to ensuring that ONE will be able to steadily secure profits over the medium and long terms. Fortunately, other container shipping companies around the world have also been reorganizing their operations, so the number of market players has significantly decreased. Therefore, this market is expected to be stable for some time.

Despite encountering some problems when first commencing services, the new company has made very smooth progress on the whole. The other two parent companies have been excellent partners, enabling us to successfully establish ONE together while aiming for the same goals. Jeremy Nixon has been appointed as CEO of the new company. An outstanding individual who was in charge of container shipping operations in the NYK Group for many years, Mr. Nixon was highly evaluated by our two partner companies. Therefore, as a global company originating in Japan, ONE is expected to operate successfully under his skillful direction.

The NYK Group’s Business Environment 1

Container shipping market

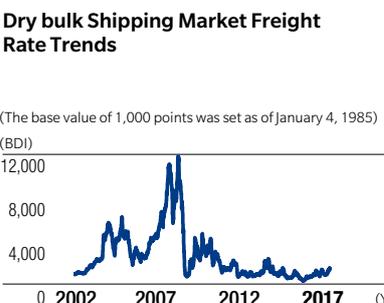
- Shipping traffic is gradually picking up
- Construction of large vessels continues to drive up oversupply



Source: In-house data compiled from the China (Export) Containerized Freight Index

Dry bulk shipping market

- Freight rates hit an all-time low in 2016
- Full-fledged market recovery is expected to take time



Source: In-house data compiled from the Baltic Freight Index

Basic Strategy 2: Expand Businesses That Secure Stable Freight Rates

Aiming to increase earnings by proactively channeling resources into businesses that have growth potential

Our second strategy is to expand businesses that secure stable freight rates. By bolstering businesses that have potential for growth, we are aiming to boost their earnings. Among the Group's businesses that secure stable freight rates, the logistics, car carrier, and automobile logistics businesses have been targeted for further growth, while the LNG and offshore businesses have been designated as priority investment businesses.

In the logistics business, the Company and its wholly owned subsidiary YLK intend to strengthen their partnership and make effective use of each other's operational resources to generate synergies. In the car carrier and automobile logistics businesses, we are utilizing digital technologies to improve transport and cargo handling efficiency while proactively implementing environmental initiatives. A case in point is a "green" terminal in Belgium operated by International Car Operators N.V., another wholly owned subsidiary. At the terminal, the Group has installed LED lighting systems and solar panels, and will begin operating wind turbines in 2019 (see pages 21 and 53 for details). It is also applying geolocation technology to more efficiently store and track

the movements of automobiles onsite. Given its status as an industry-leading automobile terminal, we are promoting it as a model case for our initiatives around the world. Meanwhile, recognizing that demand for LNG and other renewable energy sources is projected to grow through to 2050, we plan to increase the Group's fleet of LNG carriers from about 70 vessels at present to around 100 by 2022. We also intend to increase the number of LNG fuel supply ships currently operating in Europe as well as the number of pure car and truck carriers that use LNG as fuel. Furthermore, the Group plans to make use of the know-how and professional networks of the LNG business in its offshore business and other new business areas.



LNG ship to ship bunkering from LNG Bunkering Vessel to pure car and truck carrier

Basic Strategy 3: Implement Digitalization and Green Initiatives

Focusing on launching new green businesses and developing and applying digital technologies at the forefront of the industry

Finally, our third strategy is to implement the Digitalization and Green initiatives of our new medium-term management plan. Digitalization and environmental conservation are already major trends everywhere in the world. Through our Digitalization and Green initiatives, which are closely linked with the basic strategies I have discussed, we intend to provide new services and added value. We have aggressively promoted these initiatives

throughout the Group, and they are now recognized by all members as important for creating future opportunities and new value.

From early on, the Group has promoted the shift to digitalization ahead of the maritime shipping industry. The Group has been collecting data from vessel transport and sharing that data across marine and land operations, and developing various technologies for increasing the efficiency

The NYK Group's Business Environment 2

Technological progress

- Advances in digital technologies, including IoT, big data, and AI
- Changing needs of customers due to technological innovations
- Growing calls for greater efficiency and cost reductions

Environmental responsiveness

- Transition to a low-carbon society
- Increasingly strict environmental regulations
- Integration of ESG criteria in corporate value assessments

of vessel assignments and operations, as well as for designing and modifying ships. The Group has already accumulated a substantial amount of data, and now that the predictive power of analysis technology has improved through deep learning, we have begun using the data to help prevent accidents and equipment troubles. We believe that pursuing these innovations going forward will contribute to the development of manned autonomous surface ships.

Our Green initiatives are organized into three main categories: compliance with international environmental regulations, improving vessel efficiency and reducing their CO₂ emissions, and new business development. With respect to the first two categories, we are stepping up measures that have been ongoing for some time. Regarding the third category, we are looking to launch new green businesses. Demand will undoubtedly grow in the market for renewable energy, so I believe our green businesses must focus on renewable energy from hereon.

Along with solar and wind power, tidal power generation is a promising line of business. Going beyond the boundaries of cargo shipping, we are determined to quickly exploit such business opportunities going forward.

We understand that other shipping companies are also applying digital technologies and carrying out environmental initiatives, but in our case, the Group has four specialized group companies that can help drive our Digitalization and Green initiatives: the Monohakobi Technology Institute, the Group's main research and technical development center; Japan Marine Science Inc., a consulting service provider with expertise in maritime-related issues; NYK Business Systems Co. Ltd., a system planner and developer; and Symphony Creative Solutions Pte. Ltd., a startup company established in Singapore. With the combined expertise of these companies, the Group's technical development capabilities have a significant leading edge in the industry.



Development of high environmentally-friendly vessel using digital twin technology



Autonomous navigation research using ship handling simulator

Increase Efficiency and Create New Value through Digitalization and Green Initiatives, Monitoring Progress Based on the Following Key Performance Indicators

	Digitalization		Green
	Data analysis and development of applications	Progress in optimizing the entire supply chain	Green business
Quantitative indicators	<ul style="list-style-type: none"> Amount of data collected from vessels Number of software applications developed 	<ul style="list-style-type: none"> Amount of reduced CO₂ emissions per ton-mile in comparison with the fiscal 2015 level 	<ul style="list-style-type: none"> Amount of power generation capacity of renewable energy projects in which the Group is directly or indirectly involved
Qualitative indicators	<ul style="list-style-type: none"> Progress in ensuring safe navigation, reducing vessel downtime, and preventing accidents Progress in achieving environmentally friendly and energy-saving shipping operations, including CO₂ emission reductions and compliance with IMO regulations 	<ul style="list-style-type: none"> Progress in achieving set goals, processes, and deadlines for applying the following key technologies: <ol style="list-style-type: none"> Digital twin Autonomous navigation Blockchain platforms Digital forwarding Supply chain monitoring tools 	

Priority Tasks for Increasing Corporate Value and Benefiting the Communities We Serve

Continuing to give priority to safety, the environment and human resources as material issues that are integral to the Group's continuation and competitiveness

The Group is aiming to maximize earnings through its new medium-term management plan. At the same time, while working to raise corporate value, we are striving to bring value to communities around the world by helping them solve the problems they face and deal with environmental issues. To facilitate this approach of bringing value to both our business and to society, we have designated safety, the environment, and human resources as key material issues for the Group.

When discussing these material issues, I must mention an unforgettable oil spill that happened in Tokyo Bay in 1997. A large crude oil tanker operated by the Company ran aground in a shallow area of the bay, causing it to leak about 1,550 kiloliters of crude oil. The damage was so vast that the continuation of the Company was even called into question. That accident made us strongly aware of how important ensuring safety, protecting the environment, and training human resources are for the Group to continue conducting business. Since then, we have carried out a wide range of related initiatives and activities.

Beginning with safety, given that ships, aircraft, and semitrailers are in motion, we must always assume that accidents can happen. The Group has been working in earnest to ensure safety in a wide range of ways, including strictly enforcing its own NAV9000 safety standards in shipping operations. Among our measures for conservation the environment, in addition to setting targets for reducing CO₂ emissions in medium-term management plans, we have created environmental management committees group-wide, appointed

executives responsible for environmental management in four regions of the world, and held conferences several times a year to discuss and check the progress of initiatives for dealing with environmental issues in each region. With respect to human resources, we have been promoting diversity and hiring seafarers without regard to nationality, and in 2017 we appointed the first female ship captain in the Company's history. We are now training and hiring human resources to carry out the Digitalization and Green initiatives.

I believe that the Group's commitment to safety, the environment, and human resources over so many years has helped it build trust with stakeholders and be their partner of choice. We will continue focusing on these three key material issues with a view to build partnerships over the long term and stand out from our competitors.



Employees of NYK and YLK group companies participating in a training program called Global NYK/YLK Week

Investment Plans and Corporate Governance

Generating cash in-flow by liquidizing assets while cautiously and flexibly making capital investments

As financial targets under our medium-term management plan, we are aiming for recurring profit between the ¥70.0 to ¥100.0 billion range by fiscal 2022, along with return on equity of at least 8.0%, a minimum shareholders' equity ratio of 30.0%, and a debt-to-equity ratio of no more than 1.5. We will work to increase the return on equity by improving profitability, cutting costs, utilizing assets more efficiently, and maintaining the Company's bond credit ratings. Over the five years of the plan, operating cash flow

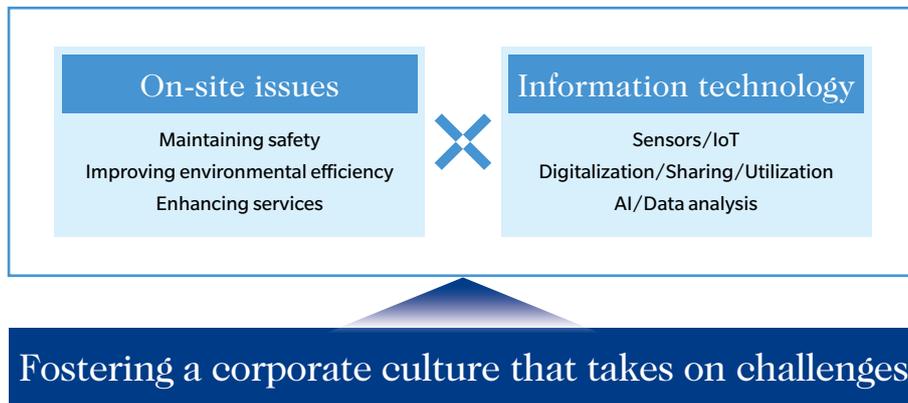
is forecast to total ¥570.0 billion on a cumulative basis, and of that amount, we plan to use ¥520.0 billion for capital investments in vessels as well as new equipment and facilities in the offshore business and environment-related projects. Since the market is still difficult to predict, our policy is to exercise caution when making investment decisions rather than pursuing bold initiatives. Although the total amount of capital investment is less than our previous medium-term management plan, we are giving



Special Feature 1 Digitalization & Green

Solving Various On-site Issues

The Group operates modes of transport such as vessels, aircrafts, and semitrailers, in addition to physical sites such as terminals, warehouses, and shipyards, as well as sales and shipmanagement businesses. Our “Creative Solutions” involve initiatives for solving the various issues faced by our sites by making use of digital technologies and analyzing collected data to create new value. In order to realize ideas more quickly, we have on-site employees that turn their ingenuity into actions, and our four labs (i.e., Monohakobi Technology Institute (MTI), Japan Marine Science Inc. (JMS), NYK Business Systems Co. Ltd., and startup Symphony Creative Solutions Pte. Ltd.) work together with each other and external partners to create solutions.



Focus: Cultivating Corporate Culture with Creative Solutions Workshops

Since 2015, we have been holding creative solutions workshops as a program for developing leaders that can drive innovation in the future, and more than 200 of our mid-career employees and young employees have participated in this program. The creative solutions workshops systematically educate our employees on identifying hands-on issues, realizing ingenious solutions, and utilizing methods for improving work, and thereby cultivate human resources that can turn their ingenuity into actions. By continuing this initiative, we aim to foster a corporate culture that takes on challenges and become a company that can continue to create differentiation that is a step ahead of the competition.



Creative solutions workshops

Vessel Sites

“ Making Onboard Work More Efficient ”

Adopting an Unmanned Machinery Space (UMS) Check System for Further Utilization of Engine Plant Data

An unmanned machinery space (UMS) check system enables the operation status of onboard machinery to be checked and recorded when conducting unmanned operation of an engine room at night. We introduced digital tablet entry for the approximately 2,000 items that were previously checked on paper, and this reduced crew work for identifying anomalies and allowed us to easily share data with other vessels. We are also promoting the development of a system to enable detected anomalies to be notified to shoreside personnel and thereby identify machinery trouble at an early stage.



Unmanned machinery space (UMS) check system

Operation Management Sites

“ Understanding the Status of Vessels ”

Utilizing SIMS + LiVE to Visualize Real-Time Vessel Operation Data

Our vessels are equipped with various sensors for steering and understanding the status of the engine plant. SIMS enables this data to be shared with shoreside personnel, and LiVE is a portal for data visualization. This data enables shoreside personnel in charge of vessel operation and shipmanagement to quickly understand the situation, and is utilized to identify optimal operation and trouble at an early stage. We are also conducting research and development into analyzing the data accumulated by SIMS.



LiVE (Latest Information for Vessel Efficiency) portal site

Logistics/Terminal Sites

“ Centralized Management of Complicated Cargo Movements ”

Developing a New System for Centralized Management to Achieve Route Optimization and Cutting-Edge Operations Such as Unmanned Gates and EDIs

Stringent storage and retrieval management is required for finished automobiles that are delivered to terminals by railway cars, transport vehicles, and vessels. At the ICO terminals in Belgium, we have achieved cutting-edge terminal operations by developing an integrated work management system that includes optimization of work plans and operations, more efficient office work using Electronic Data Interchange (EDI) with customers, unmanned gates, etc.



ICO unmanned gate system

Construction Sites

“ Building Environmentally-Friendly Vessels ”

Utilizing the Data Collected by Cutting-Edge Sensors to Design High-Efficiency Propellers

We have collaborated with MTI and Japan Marine United Corporation to develop sensors for measuring the status of vessel propeller operation in actual sea areas. The collected data was then analyzed and utilized to design a new high-efficiency propeller. The improved fuel efficiency of this propeller is expected to reduce CO₂ emissions by approximately 1.2%.



Testing a model propeller in a water tank (left) and observations of an actual vessel (right)

Creating New Value with Open Collaboration

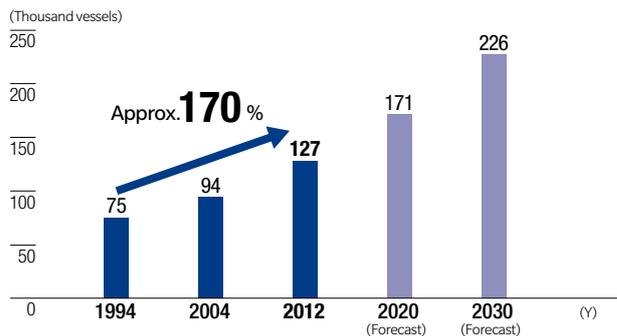
Advancements in information technology such as IoT, big data, and AI are called the fourth industrial revolution, and are expected to cause a revolution in all industries and society, and bring a shift toward a data-driven society. The Group shares the experience and data that we have accumulated over the past 130-plus years with various partners, and collaborates to accelerate digitalization and thereby work toward developing technologies from the user's perspective and create new value.

Joint Research on Collision Risk Assessment and Autonomous Operation of Vessels

Increased Risk of Collisions Due to Increasing Size and Number of Vessels

In recent years, the shipping industry has seen an increased number of vessels in operation around the world, and vessels are getting larger for transport efficiency. Due to congestion in strategic sea areas such as the Strait of Malacca to Singapore, the risk of collisions has been increasing. These circumstances have led to the need for greater technical skill and experience operating ultra-large vessels, and safely navigating through congested sea areas can place a heavy burden on crew. Furthermore, major accidents in congested sea areas are becoming a serious issue of concern for the entire industry due to the potential impact on human life, property, and the environment.

Number of Vessels Passing the Malacca Strait



Source: Created by NYK with data provided by the Nippon Foundation, 2012

Digitizing Human Knowledge from Experience and Sensations for Utilization in Safe Navigation

In 2016, together with MTI and JMS, we launched a study on collision risk assessment and autonomous operation of vessels in collaboration with the Nippon Kaiji Kyokai (ClassNK) and three companies, i.e., Japan Radio Co. Ltd., Tokyo Keiki Inc., and Furuno Electric Co. Ltd. The goal of this study is to improve the safety of vessel navigation through efforts such as the development of tools to assist with lookouts and avoid collisions with other vessels. JMS's full-mission ship handling simulator is used to understand what occurs on large vessels navigated by experienced captains, and data is collected on how they behave when predicting and avoiding risks. This data is then analyzed to promote the development of a system that can provide decision-making support to inexperienced crew.

In recent years, discussions have started on formulating international rules for Maritime Autonomous Surface Ships (MASS), and the time is ripe for marine innovation. In order for Japan to take a leading role in this movement, the Ministry of Land, Infrastructure, Transport and Tourism launched a public appeal for businesses to assist in the research and development of advanced vessel technologies, and a number of our group research projects were sponsored. We aim to engage in research and development with internationally recognized manufacturers of navigation devices in Japan and work to make established technologies more practical in order to build a safe marine transportation environment.



Vessel collision evasion experiment using JMS's full-mission ship handling simulator (photo courtesy of The Japan Shipping Exchange Inc.)

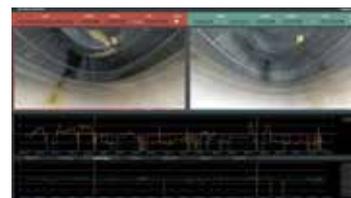


Creating New Rules for Condition-based Maintenance of Onboard Machinery

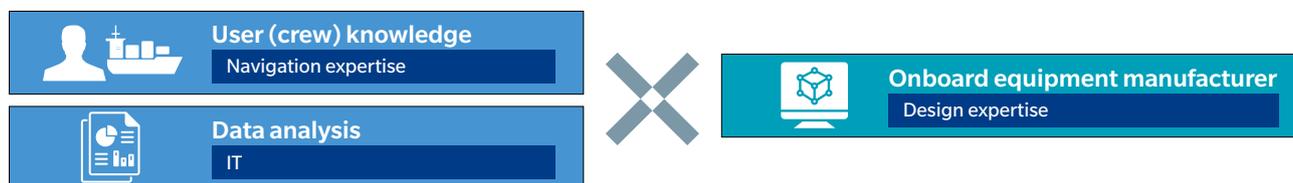
Collaborating with Manufacturers to Achieve Innovations in Vessel Maintenance Management

The Group aims to optimize maintenance by developing tools from the user perspective for monitoring the condition of machinery — tools such as Kirari NINJA and Kirari MUSE. Vessels are obligated by classification societies to conduct inspections and checks of onboard machinery based on its time in operation. However, we perform safer and more efficient maintenance work on our vessels by confirming the condition of onboard equipment based on data obtained through Kirari NINJA, etc., together with the experience of our marine engineers. Combining such user experience and

knowledge with the expertise of onboard equipment manufacturers, we are working with classification societies to craft new rules that recognize the advantages of monitoring the signs of equipment deterioration through condition-based maintenance compared with conventional maintenance based on operation time.



Status diagnosis by Kirari NINJA



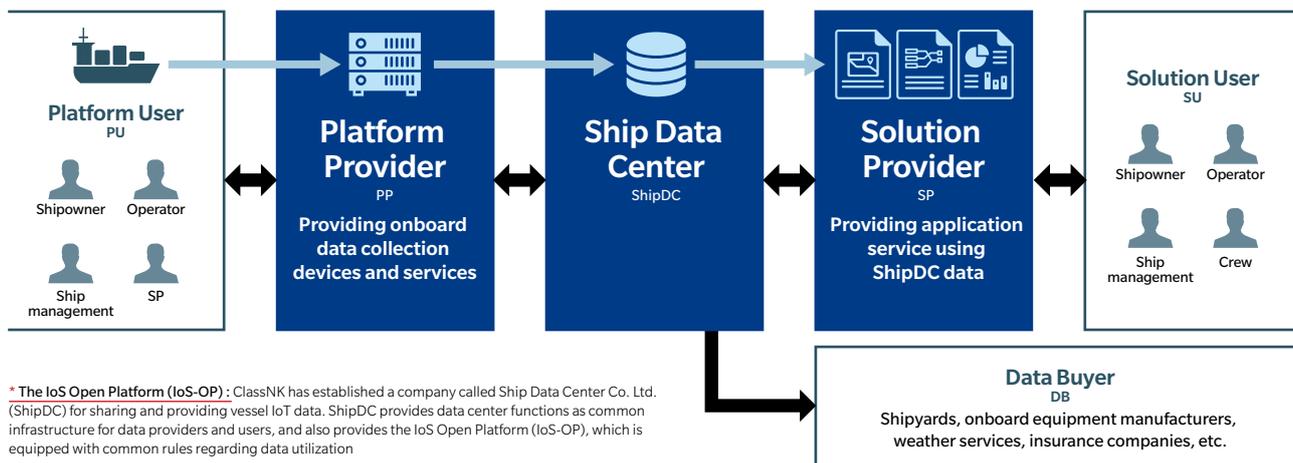
Creating a Platform for Sharing and Utilizing Vessel IoT Data

Participating in the Internet of Ships (IoS) Open Platform as a Core Member

The IoS Open Platform (IoS-OP)*, which is being attempted for the first time ever, is important infrastructure for promoting data-driven innovation that shares and utilizes data between various maritime industry companies. This platform promotes innovation by sharing data provided by shipping companies with maritime related companies such as shipyards and vessel equipment manufacturers for utilization in various specialized fields. IoS-OP is run by a consortium comprising 46 organizations, including shipping companies, shipyards, onboard equipment manufacturers,

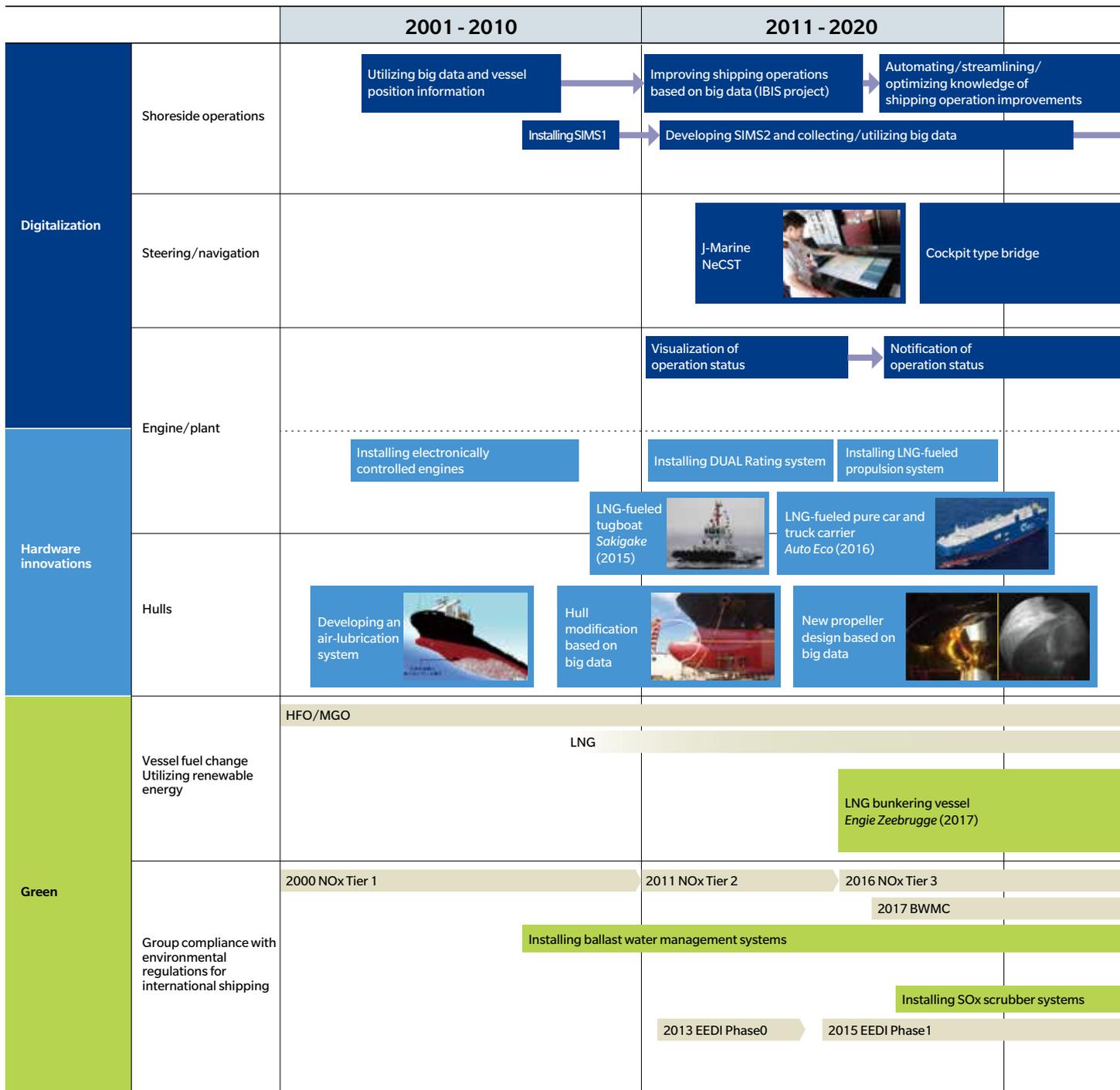
and IT companies, and is designed to maintain a high level of fairness, reliability, and independence between data providers and users.

The Group has promoted the construction of the platform as a core member of the consortium to ensure that IoS-OP has benefits for shipping companies. In the future, we will also cooperate with international classification societies to aim to achieve a global platform, while also leading innovation in all global maritime industries to improve our competitiveness.



* The IoS Open Platform (IoS-OP) : ClassNK has established a company called Ship Data Center Co. Ltd. (ShipDC) for sharing and providing vessel IoT data. ShipDC provides data center functions as common infrastructure for data providers and users, and also provides the IoS Open Platform (IoS-OP), which is equipped with common rules regarding data utilization

Formulating a Vessel Technology/Innovation Road Map



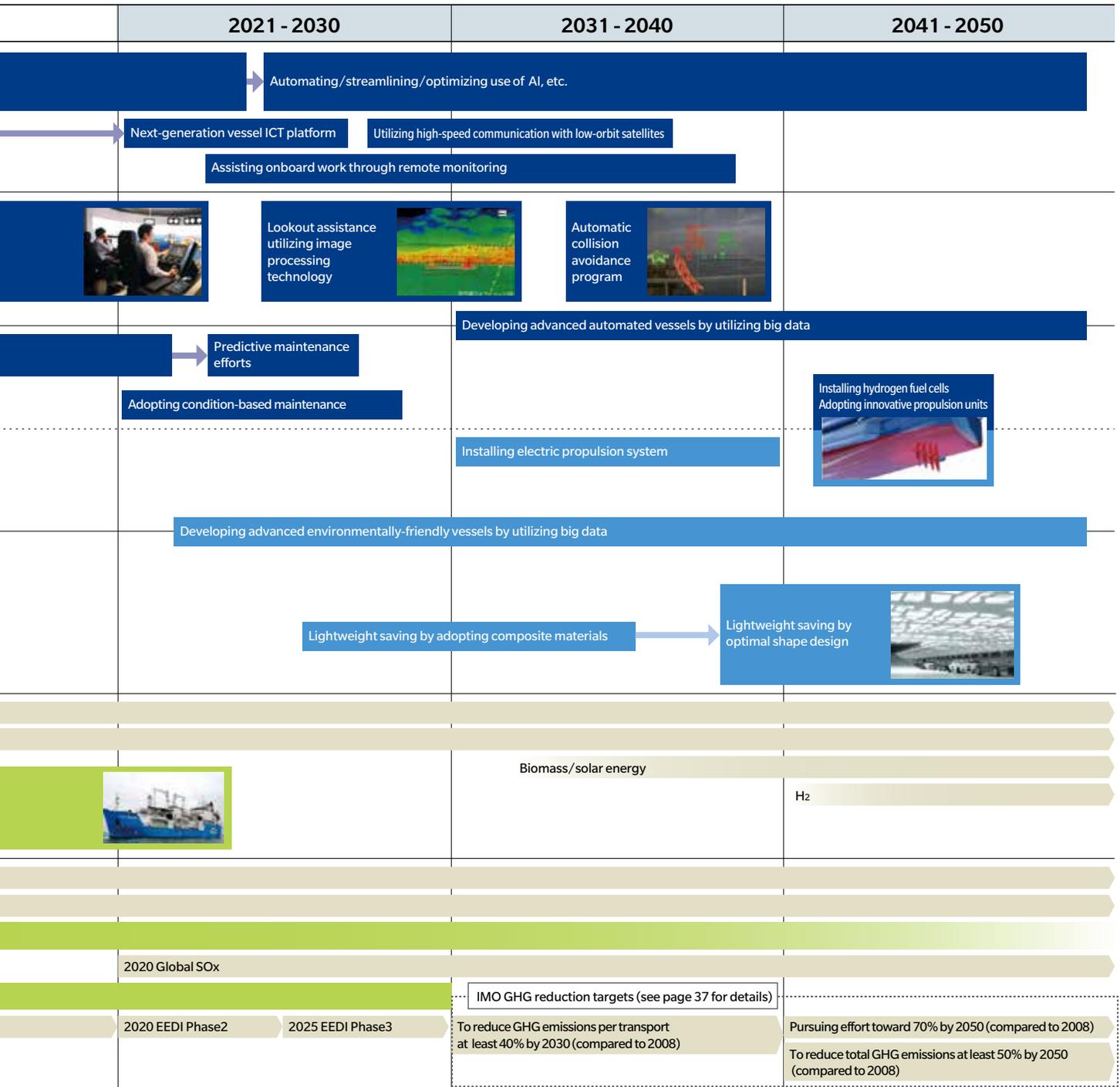
As part of the “Digitalization and Green” efforts in our new medium-term management plan, we have formulated a vessel technology and innovation road map that indicates our fields of research and time frame up to the year 2050. The Group announced its future concept ship, the *NYK Super Eco Ship 2030*, in 2009, and we have been progressing with research and development for its constituent technologies, but we have reviewed the road map due to more stringent environmental regulations and expanded fields of research due to rapid advancements in technological innovations. In order to continue

to provide new value to society and our customers, we will continue to conduct technical development that contributes to environmental and safe shipping operation from the perspectives of digitalization, hardware innovation, and green initiatives.



NYK Super Eco Ship 2030

■ = Environmental Regulations and Targets



NYK Group at a Glance

Moving Ahead with Our Management Plan

Toward Sustainable Growth (Material Issues)

Toward Sustainable Growth (Strategy by Business)

Corporate Governance

Group Medium to Long-Term Environmental Targets (CO₂ Reduction Targets)

Our new medium-term management plan defines medium- to long-term environmental targets. We plan to reduce CO₂ emissions from our vessels and produce a ripple effect down the supply chain.

	FY2030	FY2050
Vessels and ocean transportation	-30%	-50%
Ripple effect on the entire supply chain	-40%	-70%

* CO₂ emission reduction per ton-kilometer compared with fiscal 2015

Our targets to meet the 2°C target of the Paris Agreement were verified as science-based by the international Science Based Target initiative (SBTi) in June 2018.

Our targets are oriented and compare favorably with the greenhouse gas (GHG) reduction targets for international shipping adopted by the IMO.





Koji Sekimizu

Secretary-General Emeritus, IMO
Special Advisor and Distinguished Professor,
Kobe University

Tomoyuki Koyama

Managing Corporate Officer and Captain
NYK

Special Feature 2 Dialogue

Ensuring Safe and Dependable Maritime Shipping through Exhaustive and Ongoing Initiatives Extending beyond Compliance

For the maritime industry, safety is a top priority that must always be practiced. International rules concerning safe vessel operation and environmental conservation have been enacted to prevent accidents at sea and ensure the health of maritime traffic throughout the world. The United Nations specialized agency responsible for such maritime governance is the International Maritime Organization (IMO)^{*}. In this feature, Mr. Koji Sekimizu, former Secretary-General of the IMO, was invited to talk with Captain Tomoyuki Koyama, a managing corporate officer, about the Group's initiatives related to its material issues — i.e., safety, the environment, and human resources — and the future of maritime governance.

^{*} International Maritime Organization (IMO): Headquartered in London, U.K., the International Maritime Organization was established in 1958 for the purpose of facilitating international cooperation with respect to maritime issues, including the safe navigation of vessels and prevention of ocean pollution by ships. Since then, it has been adopting international treaties and standards concerning a wide range of issues, such as measures for dealing with maritime security and piracy; prevention of maritime accidents; safety standards for vessel structures; technical requirements related to handling cargoes; rules for discharging oil, toxic substances, and emissions from ships; and the adoption of regulations for improving energy efficiency and reducing GHG emissions from ships

The History of Maritime Safety

Making Effective Use of International Rules with Safety Management at the Core of Operations

Sekimizu: The history of maritime shipping is also a history of accidents. A major turning point was the sinking of Titanic in 1912. In response to that tragic accident, in 1914 a group of countries adopted the International Convention for the Safety of Life at Sea, commonly known as SOLAS, which was the first of such international treaties. After that, new treaties dealing with safety were adopted as we learned lessons from many accidents, and they have become an important

international rules and standards for the whole world.

Koyama: At the Group, we have worked to heighten sensitivity to maritime rules as we have focused on how to quickly and properly respond to the rules. For example, we set up a Safety Promotion Committee in 1992 after the frequency of maritime accidents increased in the 1980s. That is when the IMO adopted the International Safety Management (ISM) Code^{*}. We thought that NYK as a ship operating company should take greater responsibility for safety, so we established the committee as a specialized organization before putting the code into practice. Safety management was being performed by seafarers in those days, but we decided to position safety management at

the center of the Company's management by having the president chair the committee from its inception.

Sekimizu: Undoubtedly, the enforcement of the ISM Code in 1998 was an important event in the history of the modern shipping industry. Before then, it was common understanding that the captain of individual ships must take the responsibility for the safe operation of vessels, so the responsibility of the management of shipping companies was unclear. The ISM Code made it very clear that the management of companies should also be responsible for the safety of ships that are owned or operated by them. Moreover, the IMO recognized the great importance of human factors in shipping operations, so it incorporated them in international rules through the Code.

Unfortunately, however, although the ISM Code has been enforced for about a quarter of a century, serious accidents at sea still occur. When I was appointed as Secretary-General of the IMO in 2012, a large cruise ship, Costa Concordia, ran aground in the Mediterranean Sea. If safety management based on the ISM Code had been properly implemented, accidents like that would not have happened.

Compliance with treaties is required internationally, so every ship in each country makes efforts to a certain degree, but safety cannot be ensured just by following rules in a perfunctory manner without any active commitment. It is important to make a wide range of efforts, so every shipping company must do more than merely complying with the Code by making very effective use of it.

* **The International Safety Management Code** was introduced as a measure for enhancing the safety management of ships in order to prevent accidents at sea. It applies to all types of vessels that weigh over 500 gross tons sailing in international waters, and to the companies that operate such ships. Such companies must put in place a safety management system that complies with the Code, acquire applicable certification, and keep an issued valid Safety Management Certificate on board

The NYK Group's Safety Measures and Human Resources Development

Managing a Multinational Workforce and Training Loyal Seafarers

Koyama: As you said, the ISM Code is a framework, but how initiatives are carried out within that framework is the responsibility of each shipping company. The Group has set its own goals and created systems for that purpose, with a view to do whatever is necessary to transport cargo safely and provide high-quality shipping services to customers.

The ISM Code originally applied to our company-owned vessels, which accounted for only about half of our fleet at that time. Therefore, in order to create a system for ensuring the safety of all our operating vessels, we went



beyond the framework of the code by establishing our own original safety standards in 1998 called NAV9000 (see page 32 for details). We then introduced those safety standards to shipowners we charter vessels from, and shipmanagement companies to organize second-party audits of the ships and the management offices. Those audits are not one-way approach requiring improvement measures. Instead, we emphasize engaging in dialogue with our business partners, and try to have everyone understand the importance of safety management and environmental conservation. Our goal is to have owners and shipmanagement companies carry out highly effective initiatives that exceed the level of compliance.

NAV9000 not only conforms to international rules but also promotes our own best practices, such as strict safety standards for customers like major oil companies. Some of our business partners initially opposed the inspections because many items covering a wide range of issues are included. Nevertheless, by repeatedly engaging with them and continuing to explain the standards in earnest, we convinced them of the importance of the safety and environmental standards we aim for, and they eventually adopted the system.

Sekimizu: I think that is excellent. Another serious challenge for all maritime shipping companies in a process to comply with the ISM Code was related to how they would deal with diversifying labor forces and the globalization. Up until the mid-1970s, the vast majority of seafarers working on ships operated by Japanese companies were Japanese, but now more than 98% are foreign nationals. A multinational crew is like an international community on board a ship, and that makes it more difficult than before to raise the quality of operations and ensure that safety measures are properly carried out.

Koyama: We have been responding to that issue in various ways through trial and error. The Group's seafarers come from diverse backgrounds, so to share skills and know-how, the basic practices that have been ingrained among Japanese seafarers are explained in each language, and relevant information and diagrams are translated and included in manuals. Since there are limits to what can be

explained through manuals and other communication tools, we provide training for seafarers through a program called the NYK Maritime College (see page 43 for details) to make sure that the Company's policies and the importance given to safety are widely understood. Over 6,000 seafarers each year take classes in the program, which allows personnel of every nationality to receive the same education and training in various countries and regions. In an effort to educate and secure highly skilled seafarers, we took the lead in the industry with its establishment of the NYK-TDG Maritime Academy (see page 33 for details) in the Philippines in 2007. We have also been carrying out a variety of other initiatives, such as holding seafarer conventions and promoting our Near Miss 3000 program (see page 34 for details). By continuously implementing these activities, we have trained loyal and highly safety-conscious seafarers who, regardless of their nationality, identify strongly with NYK when working on board ships.

Sekimizu: The IMO has been addressing the issue of "the Human Element" since the 1990s, but it was not easy to attain the results we hoped for. NYK must have experienced some serious challenges along the way, but the fact that you reached a point of educating top-notch personnel responsible for safe shipping operations is highly commendable. Looking around the world today, no other maritime shipping companies have carried out efforts so persistently. I believe that NYK has been able to maintain a consistent level of safety of ships and firmly establish a corporate culture that places the safety at the highest position, because the Company pursued such commendable initiatives as the ones you described.

Employee Safety Training Initiatives

Strengthening Safety Management with an Awareness of Dangers after Learning from an Accident in Tokyo Bay

Koyama: You spoke earlier of the cruise ship accident in the Mediterranean Sea, but we also experienced a major accident that we will never forget. On July 2, 1997, *Diamond Grace*, an oil tanker operated by the Company, scraped the edge of its starboard bottom in Tokyo Bay on a shoal commonly referred to as Naka-no-Se, causing a major oil spill of around 1,550 kiloliters. It made us keenly realize that causing such a large-scale accident will have a huge impact on society, and even threaten the survival of the Company. The number of employees who do not understand the situation we confronted at that time is increasing now that two decades has passed since the accident. Therefore, to help ensure that the lessons learned from the accident are not forgotten, we produced

a video that recreates the accident using computer graphics and includes interviews with personnel who actually experienced it. Since March 2018, we have been using the video as a training tool, made it available on the Company's website, and distributed it to vessel owners and shipmanagement companies.

Sekimizu: The maritime shipping industry has the vital role of transporting various types of cargoes and natural resources that are essential for people's everyday lives, but the industry is easily seen only in a poor light when just a single accident occurs. For that reason alone, all employees — right up to top management — must never forget the lessons of past accidents. It is absolutely essential to keep a highest sense of risk management with an understanding that an accident could happen, and continuously make genuine efforts to ensure safety. And, obviously, personnel who have practical experiences in maintaining safety must be given opportunities to play an active role in the over-all management of the company.

Participating in the Creation of International Rules

Looking to Actively Contribute to the Future of Maritime Governance

Koyama: In your previous positions at the IMO and Japan's former Ministry of Transport, you were very involved in the creation of international rules over many years. In that sphere of maritime governance, due to Europe's historical dominance in shipping, European countries and companies have wielded the most influence. For that reason, in many cases it has been necessary for Japanese shipping companies like ours to modify safety measures to conform to new rules, and we have accepted that as a matter of course for a very long time. Now, however, Japanese shipping companies can take pride in having reached at least the same level of operational efficiency and safety assurance. Therefore, I think we should become more involved in rule-making in the future, and even create rules that have a distinctively



Japanese flavor.

Sekimizu: Yes, among the rules that have been successively created up to now, some have been so matter of course for Japanese shipping companies like NYK that there was no need to take any additional measures to enforce them. However, those rules are necessary for ensuring a level of safety for the international community.

Looking ahead, the process of rule-making will be closely tied with technological innovations aimed at making vessels safer at sea and more environmentally friendly. Japan's shipping industry should be able to play a leading role in international rule-making process, if it spearheads that kind of future technological development, takes the lead in the international maritime shipping industry, and operates globally.

Koyama: An example of one of the Company's technological innovations is our ship information management system, or SIMS (see page 21, 33, and 37 for details), a shipping performance system that we put into practical use ahead of the global shipping industry. 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 can be shared between vessels and worksites on land. By compiling the data already collected and analyzing it as big data, it can be used for identifying problems, conserving fuel, and implementing other initiatives related to improving vessel safety and reducing environmental load.

In addition, the Group aspires to make manned autonomous ships a reality (see page 22 for details). Our research is focusing on that, but it is not premised on the idea of unmanned vessels or very small crews. Instead, the purpose of the R&D is to contribute to a higher level of safety by applying autonomous navigation technologies to prevent accidents caused by human elements and to reduce the workloads of crew members.

Sekimizu: In the future, we will need proactive initiatives that would utilize the Internet of Things (IoT) and big data to improve safety and reduce environmental load. I also think that the application of autonomous ship technologies would be useful for improving safety and reducing labor burdens. On the other hand, caution must be necessary when applying artificial intelligence (AI). Ships are operated in the natural environment that is not an artificially controlled area like roads or railways and navigation in such an area ensuring safety at sea is a highly complicated process, so we must carefully consider whether and the extent to which computers can be entrusted for the decision-making in navigation, and a legal framework that would allow such navigation must also be considered.

Koyama: Yes, and in line with what you said, when the

development of various technologies progresses, it is important that this debate is not led solely by manufacturers and engineers, but also includes the views of us users who are involved in operating ships.

Sekimizu: I agree with you that maritime transport companies with many years of practical experiences should be at the center of the debate. Manufacturers tend to be primarily interested in the possibilities of technology, but the issue is what tools are actually needed for safe shipping operations, and how such tools can be applied.

This debate will be very important when international rules concerning the automation of vessels are decided in the future. What international rules will be created and how maritime governance will be shaped in future would be a big issue for the shipping industry, including NYK. Therefore, I urge NYK to become actively involved in the decision-making process so that it can shape its own future. Recognizing that NYK has been successful in the past activities in various fields taking initiatives that would go beyond the simple compliance, I am confident that NYK would also make important contributions to future rule making for the international shipping industry.

Koyama: Thank you for sharing your views with us today. Along with our focus on making shipping operations safer and conservation of the environment, we will work hard to contribute to maritime governance while continuing to meet the expectations of our customers and other stakeholders. We would appreciate your advice and suggestions in the future, as well.

NYK Group Research Results Presented in an IMO Workshop on Maritime Autonomous Surface Ships

Held in May 2018 in London, the 99th session of the IMO's Maritime Safety Committee began considering revisions to SOLAS and other international treaties in anticipation of the need to create a regulatory framework for operating Maritime Autonomous Surface Ships (MASS). During the event, an international workshop on MASS was led by Japan's Ministry of Land, Infrastructure, Transport and Tourism. As Japan's delegate at the workshop, a member of NYK Group company Monohakobi Technology Institute Co. Ltd. gave a presentation on the Group's contribution to MASS technology through efforts to digitalize shipping operations.

