

Establishment of a Sustainability Policy and Identification of Materialities

Establishment of a Sustainability Policy

Sustainability Policy

Through our creative technologies in measurement, cognition, and control, the TOKYO KEIKI Group aims to realize a sustainable society and enhance our corporate value over the medium to long term while earning public trust.

1. Identify the underlying needs of our customers and society, and continue to solve problems through our business activities.
2. Strive to reduce environmental impact and ensure respect for human rights throughout our supply chain.
3. Continue to foster a corporate culture in which diverse human resources can demonstrate their individual strengths and thrive.

As a company that supports social infrastructure, the TOKYO KEIKI Group has newly established a “Sustainability Policy” based on the perspectives of environmental, social, and economic sustainability, while upholding its previous management philosophy and action guidelines.

This policy represents the basic concept and code of conduct underlying the Group’s sustainability management, and based on this policy, each and every employee will work to develop a sustainable society and enhance corporate value over the medium to long term.

Identification of Materialities (Important Issues)

In accordance with the Sustainability Policy described above, we have identified four materialities that reflect the expectations of our stakeholders and important management issues for the TOKYO KEIKI Group. These are matters that the Group considers particularly important to enhance its corporate value with a view to realizing a sustainable society. Furthermore, in addressing these four materialities, we have adopted “establishment of a business fundamentals to support sustainable growth” as the guiding vision for the Group’s governance.

Identifying Materialities for the Group



Goals for Each Materiality

Provision of Products that Solve Social Issues

In providing products and services, we will continue to search for and resolve not only longstanding social issues but also new or latent issues that emerge in our rapidly changing society, thereby meeting the expectations and trust of our many stakeholders.

Realization of an Environmentally Conscious Society

Through its business activities, the Group is working to reduce GHG (greenhouse gas) emissions, which is an important issue of global scale. In response to market and customer demands for environmental friendliness, we will integrate the design, procurement, and manufacturing processes for our products and services to provide added value, such as energy savings. In addition, to reduce greenhouse gas emissions in Scope 1 and 2, we will pursue efficient energy use by harnessing the creativity and ingenuity of all our employees.



Enhancement of Supply Chain Management

As a manufacturer, the Group's lifeline lies in its supply chain. In order to make it sustainable and strong, we will transform it into a robust materials purchasing system that can respond to rapid changes in the market, society, and the environment, while ensuring co-existence and mutual prosperity with our suppliers. We will also address various social imperatives, such as the reduction of greenhouse gas emissions in Scope 3, the handling of hazardous substances, and human rights issues.



Support for the Activities of a Diverse Workforce

In order to meet our goals with respect to this materiality, the TOKYO KEIKI Group will promote the recruitment and advancement of a diverse range of personnel regardless of age, gender, nationality, disability, or employment status, providing a place where employees with a diverse range of attributes can play an active role. In promoting the advancement of women, we will not limit ourselves to the scope of the Act on the Promotion of Women's Active Engagement in Professional Life, but will continue to develop a comfortable working environment and expand opportunities for women to play an active role in the company.

The Materiality Identification Process

STEP 1 Ascertaining Social Issues

We have compiled an extensive list of environmental, social, and economic issues, referring to international frameworks and guidelines such as the GRI Standards, as well as the 169 targets of the SDGs.

STEP 2 Initial Screening

After conducting consultations with relevant departments within the company regarding the Group's current situation and problems with the social issues listed, we narrowed down the list to those items most relevant to the Group.

STEP 3 Developing Evaluation Criteria and Conducting Evaluations

These issues were comprehensively evaluated on two axes, "significance for stakeholders" and "significance for the Group," and represented on a "Materiality Map."

STEP 4 Determining Materialities

Issues that were rated high on both axes in the materiality evaluation were grouped together as final candidates following discussions with experts. After receiving approval from the Sustainability Committee, the Management Conference and the Board of Directors deliberated on suitability and comprehensiveness of the issues in question before coming to a final decision.

Materialities Identified



Provision of Products that Solve Social Issues



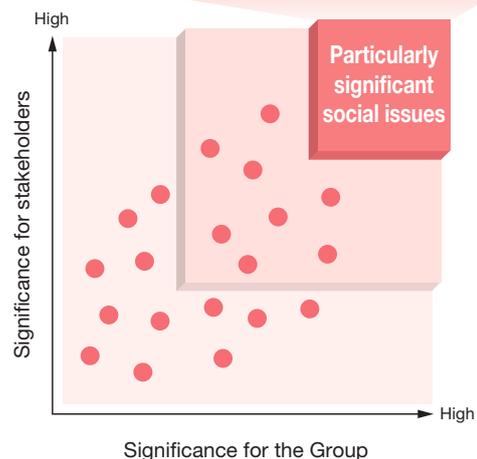
Realization of an Environmentally Conscious Society



Enhancement of Supply Chain Management



Support for the Activities of a Diverse Workforce



● indicates other social issues.

TOKYO KEIKI's Technologies to Address Social Issues in Maritime Traffic

The mission of the TOKYO KEIKI Group is to create a safe and secure society, and we have conducted our business under a philosophy of solving social issues. Following last year's spotlight on solving social issues in the field of national disaster readiness, this issue introduces TOKYO KEIKI's technologies for helping to ensure the safety and security of ships and maritime traffic.



TOKYO KEIKI's Nautical Equipment

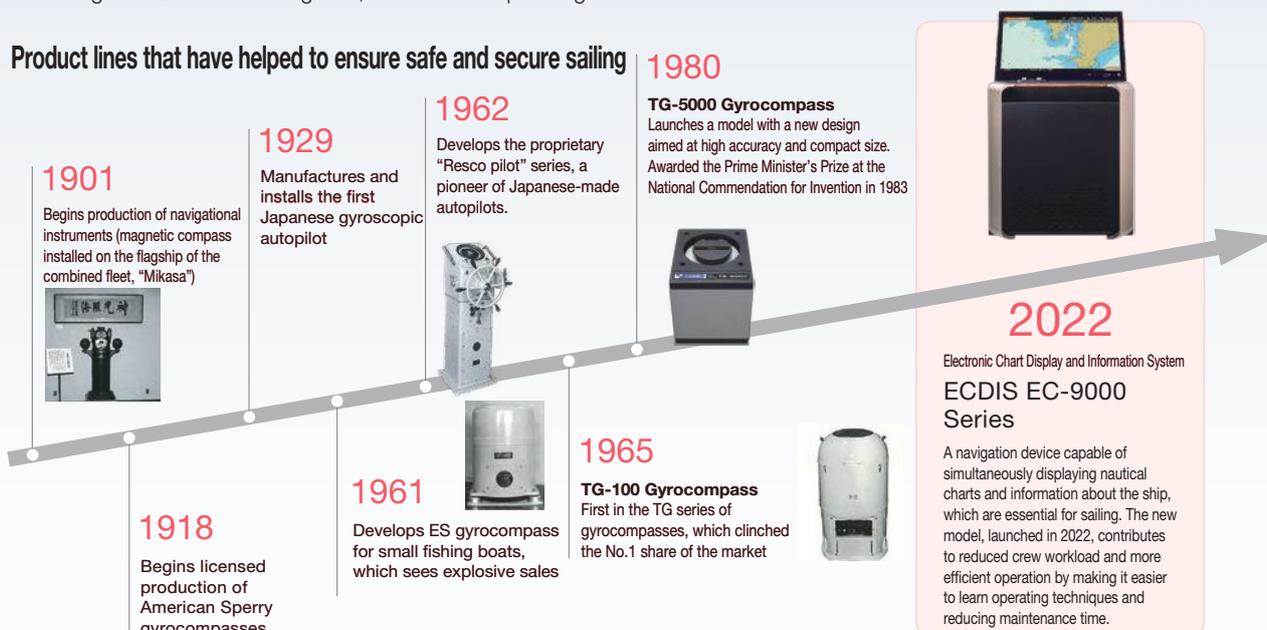
Since its establishment in 1896, the TOKYO KEIKI Group has promoted the domestic production of navigation instruments, an industry that relied heavily on imports at the time. Accordingly, we have contributed to ensure the safety of ships by creating products indispensable for sailing, from magnetic compasses to gyrocompasses*1, and even the forerunner of today's autopilots*2, the Resco pilot. Despite the dramatic expansion of our fields of activity, as our founding business, our passion for developing products that protect the safety of maritime traffic remains unchanged.

Now, with the times at a turning point, the challenges required of the nautical world are also beginning to change. In addition to ensuring safe and secure navigation, there is now a pressing

need to address social issues such as climate change. By further evolving the technologies we have built up over the years, we hope to help tackle social issues by developing of new technologies that will lead to environmental measures such reductions in GHG (greenhouse gas) emissions and measures to deal with the declining birth rate and aging population.

In this spotlight, we introduce our efforts to address climate change through energy-efficient ship operation technology (p.14), to address the shortage of crew members through automated navigation technology (p.15), and to improve the safety of maritime traffic through maritime surveillance radar and ship information management technology (p.16).

Product lines that have helped to ensure safe and secure sailing



(Notes) *1 Gyrocompass: A device that points to the bow direction of a ship.
*2 Autopilot: An automatic steering system. It functions by performing automatic calculations, turning the bow to a set heading, and maintaining that heading after the bow is turned.

Contributing to solving social issues through ship-related technologies



Helping to Reduce GHG (Greenhouse Gas) Emissions through Energy-Efficient Ship Operation

The Wind Challenger Project



Energy-efficient operation using a hybrid of huge sails and engines

The Wind Challenger Project is a joint research project led by Mitsui O.S.K. Lines, Ltd. and Oshima Shipbuilding Co., Ltd. that focuses on making the energy used to drive ships greener. The TOKYO KEIKI Group is providing gyrocompass and autopilot systems for the large sailing vessels under development in order to help achieve energy-efficient sailing. The first large commercial vessel of this type was completed in October 2022.

The hard sail can be automatically extended, retracted, and redirected depending on wind direction and speed.



Participating in the project with autopilots and gyrocompasses

NCTeN: a new control system

For ships with sails, which are affected by wind to a greater extent than normal ships, energy-efficient sailing cannot be achieved unless the wind is properly gauged and external disturbances such as waves, swells, and tidal currents are estimated more accurately, thereby enabling optimal rudder control. To address these needs, TOKYO KEIKI has developed a new control method, "NCTeN," which takes advantage of the advanced control technology we have honed through the development of autopilot systems. NCTeN uses a variety of navigational data to estimate the components of disturbances and the vessel's distinctive hull motion characteristics, enabling it to maintain a proper course without unnecessary steering when it meets these external disturbances.

Social Impact

It is said that the GHG emissions of the shipping industry as a whole are equivalent to those of Germany. The volume of global maritime transport, which had temporarily stalled due to the impact of the COVID-19, is rebounding again as the global economy recovers. Given such circumstances, reducing GHG emissions from the shipping industry represents a pressing issue.

The Wind Challenger Project has developed a wind propulsion system that uses an extendable

hard sail made of glass fiber-reinforced plastic. A single hard sail is expected to reduce GHG emissions by approximately 5–8% compared to a conventional vessel of the same type, and its excellent environmental performance is attracting attention from all quarters. The gyrocompass and autopilot provided by TOKYO KEIKI contribute to energy-efficient sailing by incorporating control algorithms optimized for large sailboats with hard sails.



Addressing Crew Shortages and Reducing Workloads

The Fully Autonomous Ship Program



Tokyo Keiki's technology proven in demonstration tests of fully autonomous ships

TOKYO KEIKI is participating in the Designing the Future of Fully Autonomous Ship (DFFAS) consortium, part of the Nippon Foundation's MEGURI2040 Fully Autonomous Ship Program, and is responsible for developing an automated onboard navigation system and its Fleet Operation Center for emergency monitoring and operation. In February 2022, the consortium conducted a trial simulating the actual operation of a fully autonomous ship at a distance of approximately 790 kilometers between Tokyo Bay and Tsu-Matsusaka Bay. Our autopilot and FOG-Compass (fiber optic gyrocompass) have been installed on the container ship SUZAKU, which is equipped with autonomous navigation features. The onboard autopilot PR-9000 is an original system reconfigured for DFFAS, and it constantly controls the rudder to keep SUZAKU on its scheduled course. Furthermore, it has

been demonstrated that remote operation of the vessel from the fleet operation center can be reliably performed by interfacing with our multi-functional joystick controller built into the emergency response block.

The PR-9000's onboard track control system* enables highly accurate automatic navigation along a set route line by sequentially adjusting the course to minimize any deviation between the vessel's position and the route based on route and sensor information. Reducing deviations from the route also reduces fuel consumption, thereby helping to reduce GHG emissions.

The FOG compass, which is incorporated into the automatic navigation system, is responsible for measuring bow heading, rolling, and pitching, and promises to be the kind of high-precision attitude and heading sensor required for fully autonomous vessels.

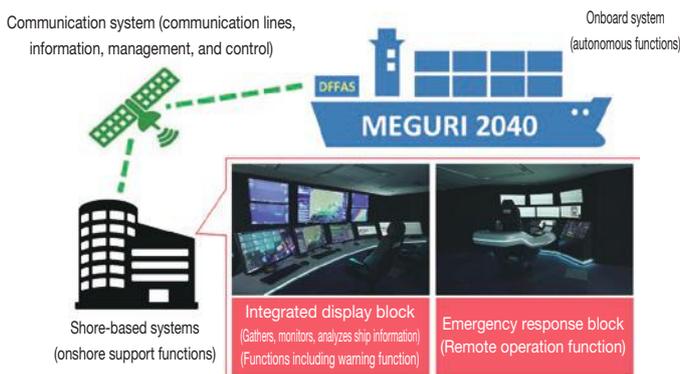
(Note) *Track control system: A system combining autopilot and ECDIS.

Social Impact

Currently, the domestic coastal shipping industry is facing an aging workforce and a growing shortage of crew members, and it is feared that if this situation continues, not only will the safety at sea be compromised, but distribution using maritime transport may also come to a standstill. The labor shortage will become even more acute as a large number of veteran seafarers begin to retire, and there are also concerns about a lack of skills among the crew who will replace them in the industry. There are growing hopes that with further maritime traffic congestion expected, fully

autonomous ships will ensure safe sailing and reduce the workload on navigators as crew numbers shrink.

The fact that the fully autonomous navigation system was able to sail in Tokyo Bay, one of the world's most congested sea areas with approximately 500 vessels passing through per day, raises the possibility of reducing maritime accidents and helping to compensate for the labor shortage in the domestic coastal shipping industry, which is expected to lead to new ways of working and increased labor capacity for crews.



The PR-9000 autopilot installed onboard the container ship "SUZAKU"



The joystick controller installed in the onshore emergency response block. The autopilot can be controlled by simply moving this small control lever.



Helping to Achieve Safe Sailing

VTS system for Vessel Traffic Service Centers

TOKYO KEIKI's VTS systems in operation throughout Japan

VTS^{*1} systems are systems that provide navigational assistance on congested maritime traffic routes, and can be considered the port version of air traffic control in aviation. TOKYO KEIKI provides VTS systems to Japan Coast Guard Vessel Traffic Service Centers nationwide to help ensure the safety of navigation.

A VTS system includes maritime surveillance radars, an AIS^{*2} information management system, and a VTS operational console. Moving vessels are monitored by high-resolution^{*3} radar, and various information on vessel movements, including AIS information, is processed centrally by the maritime traffic information processing system. This displays the expected location of ships in transit and identifies areas of the sea where there is a risk of collisions and other hazards. This information is used to support operations such as the provision to vessels of warnings, navigational corrections, and other information.

(Note) *1 VTS: Vessel Traffic Service

*2 AIS: Automatic Identification System

A system installed on board a vessel that automatically transmits and receives data such as the vessel's name, position, course, speed, and destination to other vessels and land-based facilities by radio.

*3 Resolution: Ability to identify objects.



Japan Coast Guard Vessel Traffic Service Center

Social Impact

In crowded waters with limited space, such as Tokyo Bay and the Seto Inland Sea, there is always the possibility of a maritime accident. Ensuring the safety of maritime traffic is essential for protecting the sea and the lives of those who work there, as well as for maintaining stable logistics. Our VTS systems have been installed in all of the seven vessel traffic service centers managed and operated by the Japan Coast Guard, protecting the safety and security of vessels in Japan's ports and harbors.

The radar used in the VTS system is a high-resolution, Ku-band solid-state radar. Ku-band is one of the microwave frequency bands used in radar, and its use of higher frequencies than the commonly used X-band allows higher resolution can be achieved. As such, although two vessels close to each other may line up and appear as one vessel with X-band radar, Ku-band radar will be able to clearly distinguish them. Backed by this advanced technology, we have begun offering high-resolution Ku-band solid-state radars for the domestic and international markets. This product, a Japanese version adapted to EU safety performance standards, has won high acclaim for the high resolution that it can provide, which could not be obtained with the X-band products used in Europe until now. Going forward, we will also contribute to the monitoring of Europe's crowded coasts and rivers.



High-resolution solid-state radar equipment



Maritime traffic information processing system



AIS base station