Environmental Initiatives

As global warming, deforestation, and various forms of pollution worsen, the YBHD Group is committed to protecting the global environment through corporate activities to reduce environmental impacts and ensure that we pass on a vibrant Earth to future generations. We also strive to build resilient infrastructure to safeguard lives and businesses from natural disasters such as earthquakes, super-typhoons, and heavy rainfall. Through these efforts, we aim to contribute to a sustainable society by “creating a resilient social environment and harmonious coexistence with the natural environment”.
While Group companies have previously established their own quality and environmental policies, we have now formulated a new Groupwide Environmental Policy to strengthen our approach to environmental issues. Operating companies will reflect this policy in the environmental measures implemented in their departments and promote these initiatives.

Reference Environmental Policy →https://www.ybhd.co.jp/sustainability/policy.html

Environmental issues and materiality

Responding to the material risk associated with climate change and natural disasters

We are responding to the increasing risks of natural disasters due to worsening climate change and working to ensure the safety of employees and business continuity. We continuously conduct drills simulating emergencies to establish a business continuity framework and ensure the reliable operation of our business continuity plan (BCP).

To reduce environmental impact in our business activities, we are also promoting the introduction of renewable energy, eliminating material waste and improving recycling rates, developing and providing products and technologies with minimal environmental impact, reusing equipment, and implementing power-saving measures at each business site.

Materials flow (as of FY2023)

Inputs	
Energy	
● Electric power	24.69 million kWh
● Gasoline	571 kL
● Diesel	721 kL
● Kerosene	159 kL
● Gas	788,000 m³
Water	98,000 m³
Main construction materials (steel)	112,000 t

Yokogawa Bridge Holdings Corp.

Bridge business
Engineering business
Precision equipment business
Real estate business

Outputs	
CO_2 emissions	12,250 t-CO_2
Construction waste	42,733 t
Steel-related emissions Steel reuse rate	12,656 t 100 %

Responding to demand for the development of disaster-resistant products

To meet the demand for durable and disaster-prevention products, we are developing earthquake-resistant products that help reduce disaster damage, as well as products and construction methods that facilitate rapid recovery.

Responding to demand for retrofitting services and maintenance associated with National Resilience Promotion

As the demand for more manageable maintenance increases, we are focused on developing technical products for road network maintenance, preservation, and upgrading. This includes improving the functionality of existing infrastructure, developing technologies for updating infrastructure, and developing aluminum and stainless steel products suitable for maintenance.

Reference Technology Strategy
→P.61

Reference Materiality Items and KPIs
→P.71

Initiatives to address climate change (Disclosure in line with TCFD[*1] recommendations)

The international community strongly advocates a transition to a decarbonized society as climate change causes more frequent abnormal weather events and more severe flood damage. As a group of companies responsible for social infrastructure development, we have been addressing various issues caused by climate change through our business, including developing disaster-resistant infrastructure, long-term bridge maintenance, and disaster recovery support.

The YBHD Group recognizes climate change as a critical management issue and, in 2020, identified “Responding to the material risk associated with climate change and natural disasters” as a materiality (key issue).

Furthermore, in December 2021, we expressed our support for the TCFD recommendations. In May 2022, we set out to achieve carbon neutrality by reducing CO_2 emissions (Scopes 1 and 2) in our business activities to zero by fiscal 2050. To achieve this, we have established a mid-term target of a 50% reduction[*2] in Scopes 1 and 2 CO_2 emissions in fiscal 2030 and a short-term target of a 20% reduction[*2] in fiscal 2024. Additionally, we will work to reduce Scope 3 emissions in collaboration with stakeholders such as suppliers and customers.

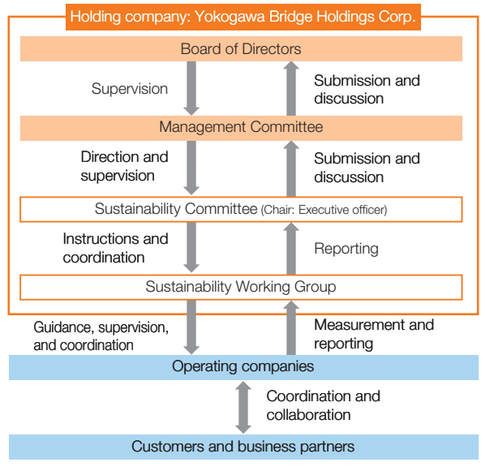
*1 Task Force on Climate-related Financial Disclosures
*2 Using fiscal 2020 as the base year

(1) Governance

In its Sustainability Policy, formulated in fiscal 2021, the YBHD Group declared its commitment to working actively and proactively to resolve social, environmental, and other sustainability issues. Climate change was deliberated as a materiality (key issue) for the Group by the Sustainability Committee, a cross-group meeting body, and decided by the Board of Directors.

The Sustainability Committee examines proposals related to basic management policies on sustainability and ESG, including climate change response, and policies and strategies for business activities and corporate governance. The Management Committee deliberates important policies and measures, which are then reported to, deliberated on, and decided by the Board of Directors. The Sustainability Committee, which comprises senior staff and executive officers from each operating company, is chaired by executive officers of major operating companies. The Sustainability Committee, which comprises senior staff and executive officers from each operating company, is chaired by executive officers of major operating companies. The Sustainability Working Group, a sub-organization of the Sustainability Committee, promotes the implementation of policies and strategies decided by the Management Committee and Board of Directors. The Sustainability Working Group, consisting of general affairs department heads from each operating company, carries out practical tasks such as promoting CO_2 emission reduction measures and monitoring progress in operating companies.

Matters deliberated and decided by the Management Committee and Board of Directors are incorporated into the initiatives of each operating company’s operational departments. We coordinate and collaborate with relevant parties to reduce CO_2 emissions in the supply chain (Scope 3). The Management Committee and Board of Directors monitor the status of materiality initiatives, including climate-related issues, at least once a year and provide direction and supervision.



(2) Strategy

We conduct scenario analysis to clarify how climate change affects the YBHD Group’s business and finances. The analysis covers the Group’s main

businesses (bridge, engineering, and precision equipment) and considers present, short-term (2–3 years), medium-term (around 2030), and long-term (around 2050) time frames.

Identifying climate-related risks and opportunities first involves listing risk and opportunity factors in the value chain for both “transition” and “physical” climate impacts for each target business. These are then classified and organized by “procurement”, “direct operations”, and “product/service demand”. For each factor, we consider the specific content of the impact, the likelihood and magnitude of the impact, and when the impact may occur to identify the final business impact.

While the YBHD Group’s direct CO_2 emissions (Scopes 1 and 2) from business activities are not substantial, the bridges and engineered structures we provide use steel, cement, and other materials that emit a large amount of CO_2 during their manufacture. CO_2 emissions are also generated from the transportation of these raw materials and building materials, and from the operation of heavy machinery during construction. In addition, as requests for environmental consideration from local governments and private-sector companies, which are our main customers, are increasing year by year, we are developing technologies such as low-carbon construction methods and low-maintenance products, and pursuing a 100% recycling rate for steel materials throughout the Group.

Given these business characteristics, we have identified the main risks as increased construction and procurement costs due to tighter CO_2 emission regulations and the introduction of a carbon tax, damage to our facilities and supply chain disruptions due to more frequent and severe abnormal weather events, and lower labor productivity at construction sites due to chronic temperature increases. We have also identified opportunities such as the expansion of national resilience, disaster prevention/mitigation, and maintenance markets, as well as increased demand for environmentally friendly bridges and buildings.

The Sustainability Committee manages the progress of analyzing business impacts and response measures for significant risks and opportunities identified through scenario analysis, with the Board of Directors monitoring and supervising. The YBHD Group is appropriately working to maintain resilience against climate-related risks, reflecting this in our medium-term management plan and formulating business strategies accordingly.

(3) Risk management

The Sustainability Committee identifies climate change-related risks and assesses their impact on business. The Sustainability Committee and the Sustainability Working Group, which handles practical matters, collaborate to consider countermeasures for identified risks. Particularly important issues are reported to and deliberated by the Board of Directors. Additionally, information on these risks is shared with the cooperation of the Compliance Risk Management Committee, an advisory body to the Board of Directors, and they are integrated as company-wide risks.

From fiscal 2024, the newly established Integrated Risk Management Committee will comprehensively manage these risks across the entire Group.

Reference Integrated Risk Management Committee
→P.106

Major climate change-related risks and opportunities identified as having a significant impact, and their countermeasures

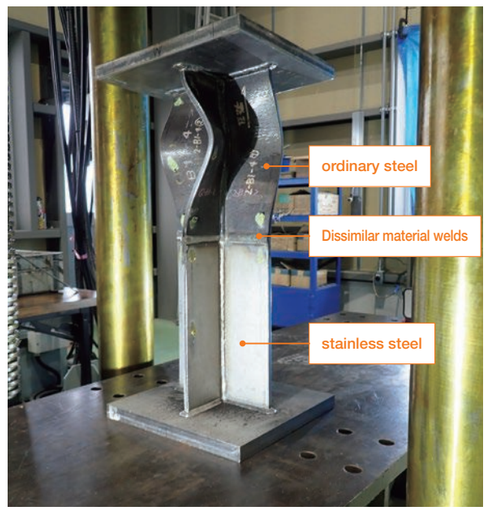
Category	Risks / Opportunities	Time frame*1	Impact on business*2	Measures
Risks	Increase in steel prices and shortages due to introduction of low-carbon technologies	Long term	Price increases due to the introduction of new technologies to achieve decarbonization in the steel manufacturing process, and domestic steel shortages due to the export of low-carbon steel	● Cooperation with steel manufacturers in the development of decarbonization technologies ● Application of new materials such as FRP-balsa materials, lumber, and low-carbon concrete to the Group’s business fields
	Increased incidents of heatstroke and reduced work efficiency due to rising temperatures, and increased costs for heatstroke countermeasures	Present	Increased incidents of heatstroke due to rising temperatures, leading to lower productivity and difficulty securing personnel; Additional safety measures become necessary, incurring costs	● Achievement of CO_2 reduction targets ● Introduction and use of ICT for working environments and health management ● Promotion of labor savings through robotization of welding operations and use of ICT ● Provision of air-conditioned clothing, etc., in the workplace ● Strengthening BCP-related investment, facilities, and personnel ● BCP formulation and continued effective utilization and training ● Utilization of products and construction methods that facilitate early recovery in the event of an unanticipated disaster
	Extreme weather conditions impacting procurement networks, disrupting or delaying construction	Present	Frequent cases of supply chain disruption and operational restrictions, or factory/construction site shutdowns due to typhoons and heavy rains	
	Damage to own facilities due to extreme weather	Present	Damage to company facilities due to flooding and strong winds from abnormal weather	
Opportunities	Expansion of national resilience, disaster prevention, mitigation, and maintenance markets	Present	Increased construction demand for bridges with high durability and easy maintenance, and disaster-resistant civil engineering steel structures	● Responding to increased orders and production expansion by developing a DX-based production management system and sales management system ● Accurately identifying demand for bridge replacement and facility relocation, and strengthening technical proposal capabilities ● Development of technologies that contribute to improving safety and workability at disaster sites by promoting construction DX ● Provision of Pre-cast Sea-walls to reduce the damage caused by tsunamis and storm surges ● Provision of internal water pressure-compatible tunnel segments for underground rivers that are prepared for heavy rainfall disasters ● Provision of technology for replacing aging road bridge decks ● Provision of maintenance-related products made of aluminum and stainless steel ● Provision of hybrid steel and wood products ● Application of effective elemental technologies such as electric furnace steel, low-carbon concrete, and environmentally friendly paints ● Use of the new technology of decarbonized processing machinery (electric and hydrogen) ● Promotion of technological developments such as pre-casting and rapid construction methods to shorten construction periods on-site

*1: Time frames: present, short term (2–3 years), medium term (around 2030), long term (around 2050)
*2: The impact on business is evaluated on a four-point scale according to the sales ratio of the affected business, and those identified as having a significant effect are indicated

Rapid Guard Fence (precast wall balustrade)

Installation of precast composite decks

Completed installation of precast composite decks



Experiment on hybrid structure of ordinary steel and stainless steel

(4) Indicators and targets

As indicators and targets used to assess and manage climate-related risks and opportunities, in May 2022, the YBHD Group announced a long-term goal of "achieving carbon neutrality by 2050" and established short-term and medium-term CO_2 emission reduction targets as milestones toward realizing this goal.

The short-term goal is positioned as a focus initiative in ESG management to "establish a robust business base for the next 100 years," as indicated in the Sixth Medium-Term Management Plan (FY2022–2024), which started in fiscal year 2022 and is being strongly promoted across the entire Group.

CO_2 emissions reduction target

Scope	Base year	Target year	Target
Scopes 1 & 2	FY2020	FY2024 (Sixth Medium-Term Management Plan period)	20% reduction
		FY2030	50% reduction
		FY2050	Carbon neutrality
Scope 3	Work to reduce while collaborating with stakeholders such as suppliers and customers		

CO_2 emissions performance over time (Unit: t-CO_2)

	FY2020	FY2021	FY2022	FY2023	Percentage
Scope 1	2,539	4,856	4,508	5,406	1.5%
Scope 2	10,779	10,647	6,241*1	6,844	1.9%
Scope 1 & 2 total	13,318	15,503	10,749	12,250	3.5%
Rate of change	Base year	+16%	-19%	-8%	
Scope 3	332,518	361,007	431,556	341,579	96.5%
Scope 1, 2 & 3 total	345,836	376,510	442,305	353,829	100%

*1: Starting in fiscal 2022, we switched part of our purchased electricity to a CO_2 reduction plan, and we are also installing solar power generation equipment (PV) at offices and plants, significantly reducing Scope 2 emissions.

Installation of solar power generation equipment at Izumi and Kishiwada plants

Kenichi Tokida, Production Section 2, Production Division, Advanced Engineering Department, Yokogawa Bridge Corp.

As part of our CO_2 reduction efforts, in February 2024, we installed solar power generation equipment for self-consumption at the Izumi Plant and Kishiwada Plant, which manufacture precision machinery frames in Osaka Prefecture. Simultaneous construction at both sites while keeping the plants operational posed challenges in securing materials, workspace, and coordinating work schedules. However, we completed the project as planned through close consultation with Yokogawa System Buildings (responsible for equipment installation). The plants maintain a constant internal temperature throughout the year to manufacture high-precision products, and the solar power generation equipment is expected to supply the power for numerous air-conditioning units.

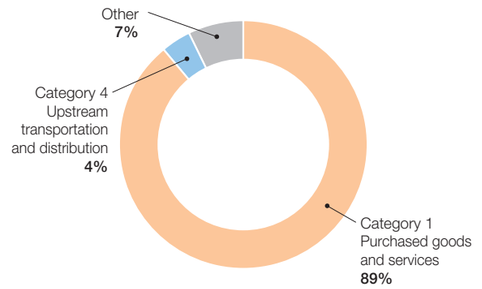
Izumi Plant

Kishiwada Plant

Efforts to reduce Scope 3 emissions

In our Scope 3 emissions, the proportion of Category 1 (purchased goods and services) is high. The bridges, engineered structures, and civil engineering products provided by the YBHD Group use large amounts of steel, concrete, and paint as their primary raw materials. Reducing CO_2 emissions from the purchase of these raw materials is a critical challenge to achieve carbon neutrality. We have a shared recognition with suppliers that the policy for reducing CO_2 emissions from raw materials is to strive to utilize new technologies resulting from each supplier's technological innovation. Green steel, recently introduced by steel manufacturers, is one such technology that could lead to future innovations in steelmaking, and the YBHD Group will be the first to apply it to bridges in Japan. We have discussed and confirmed the policy for reducing CO_2 emissions through new technology with clients through an industry association. Current challenges include establishing methods for evaluating the benefits and costs of introducing new technologies and implementing CO_2 reductions across the life cycles of our products. We will actively promote the use of new technologies and work on solving issues in collaboration with project owners, suppliers, and product users.

Breakdown of Scope 3 emissions by category



Column First uses of green steel in the bridge industry

In our efforts to reduce Scope 3 emissions in collaboration with suppliers, we will be the first in the Japanese bridge industry to use green steel, which does not generate CO_2. "Green steel" refers to steel for which CO_2 reductions during the steelmaking process are allocated to specific steel products, effectively making their CO_2 emissions zero.

The project in question is the Fukuoka Route 201 Shin-Asakura Bridge (Inbound Lane) and Other Superstructure Construction commissioned by the Kyushu Regional Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism. It involves the construction of two steel bridges, the Shin-Asakura Bridge (steel weight: 328 tons) and the Kagamiyama Overpass (steel weight: 265 tons) in Kawara Town, Tagawa District, Fukuoka Prefecture. "Achieving carbon neutrality" was one of the themes for technical proposals during bidding, and Yokogawa Bridge won the bid by proposing the use of green steel.

In this project, we will use NSCarbolex® Neutral (for Kagamiyama Overpass) from Nippon Steel Corporation and Kobenable® Steel (Premier) (for Shin-Asakura Bridge) from Kobe Steel, Ltd., which are low-CO_2 steel materials, as green steel.

Additionally, at Yokogawa Bridge's Osaka Plant, we will partially switch the electricity used in bridge manufacturing to an emission reduction plan, aiming to achieve the Scope 1 and 2 reduction targets for fiscal 2024.

Shin-Asakura Bridge

Kagamiyama Overpass

Initiatives for biodiversity

The YBHD Group's activities have the potential to impact the natural environment in all kinds of locales and settings where there are diverse ecosystems. Under these circumstances, we make efforts to minimize the impact on biodiversity.

Some projects the YBHD Group participates in require construction methods that do not affect biodiversity as a condition of construction, and failure to comply could result in a breach of contract.

To address such risks, the YBHD Group, under its biodiversity policy, gathers information on rare wildlife in areas related to our business, plans necessary measures, and does what can be done to protect and restore biodiversity.

Reference Biodiversity Policy

→https://www.ybhd.co.jp/sustainability/policy.html

Initiatives to conserve the habitat of raptors in the construction of the Tanamigawa Bridge

Hironobu Kai, Osaka Construction Division 1, Osaka Construction Department, Yokogawa Bridge Corp.

The Tanamigawa Bridge in Kushimoto Town, Higashimuro District, Wakayama Prefecture, at the southernmost tip of Honshu, is a road bridge in an area rich in nature and home to a wide variety of flora and fauna. Among them, raptors, which sit at the top of the food chain, symbolize biodiversity. The Oriental honey buzzard and the grey-faced buzzard, designated as near-threatened in Wakayama Prefecture's Red Data Book, are particularly sensitive to environmental changes. However, since this project is a critical part of an emergency transportation route in anticipation of a Nankai Trough earthquake, we are taking the following measures during construction: 1) To reduce noise that could disturb nesting activities, we use low-noise, low-vibration construction machinery and hydraulic tools (Ace Power Wrenches) for steel girder joining, making the noise and vibration control effects visible with sound and vibration meters. 2) Food waste generated on-site is stored indoors to prevent the attraction of crows and other animals, thereby protecting raptor eggs and chicks. 3) As raptors are sensitive to the human gaze, all construction personnel are instructed to avoid looking directly at wild birds. Through these activities, we strive to preserve the habitat of raptors and minimize the impact on their breeding activities during construction.

Tanamigawa Bridge (construction site)

Twenty-one-year follow-up survey of a weathering steel bridge equipped with a solar-powered ventilation system inside the girders

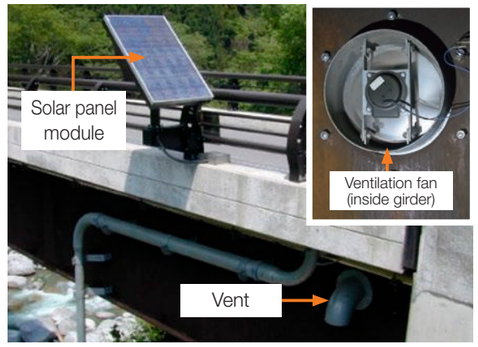
Takuya Kamino, Research Section, Technical Research Laboratory, Yokogawa Bridge Holdings Corp.

The YBHD Group has been developing technologies to reduce environmental impact using solar power generation. One such initiative is a solar-powered ventilation system inside the girders, which was installed in the Iwanami Bridge completed in 2002 in Takayama City, Gifu Prefecture. This system runs ventilation fans with electricity generated by solar panels to ventilate the interior of the box girders. When the necessary power is reached on sunny days, the fans operate, drawing dry outside air into the box girders. On rainy days, the fans do not operate, preventing humid outside air from entering the box girders—a simple and rational system. This eliminates the need to paint inside the box girders made of weathering steel, while using renewable energy reduces construction and maintenance costs and environmental impact.

At the Technical Research Laboratory where I work, we have continued regular follow-up surveys of this bridge since the installation of this system, passing on the technical knowledge from senior to junior members. In the 21st-year survey conducted in fiscal 2023, we confirmed that the system and the inside of the box girders remain in good condition. During the survey, we also cleaned the interior and exterior of the box girders, removed a hornet's nest found inside, and implemented measures to prevent insect intrusion.

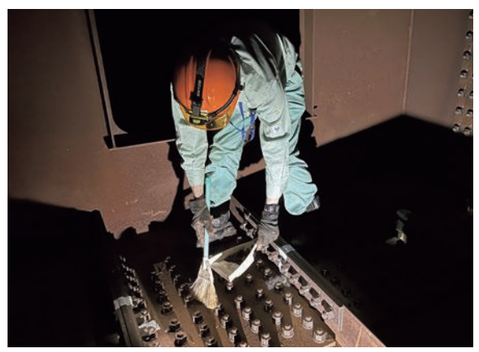
This system, conceived about 20 years ago, can still be considered rational today, and we can learn a lot not only from our predecessors' technology but also from their way of thinking. With a commitment to learning from the past, I am determined to develop even more environmentally friendly structures.

Iwanami Bridge



Girder ventilation system

Measurement inside a box girder



Cleaning inside a girder