Corporate Profile

English version
At IHI Group, we design and build progressive engineering solutions for people and planet.

Our heritage is built upon a shared culture of striving for the highest standards in every facet of our business. This approach commits all relationships to our management philosophy of contributing to the development of society through technology.

We work alongside customers, stakeholders and fellow employees to deliver outcomes that positively affect the world and its inhabitants. This powers our relationships to greater outcomes, and also makes good commercial sense. At our core, we are people who apply forward thinking to find lasting solutions to the toughest problems.

IHI Group. Realize your dreams.
Management message

Seeking to become a more trusted corporate group by strengthening our earnings foundations

It is a pleasure to overview the activities of the IHI Group, which I am honored to lead.

IHI was established as Ishikawajima Shipyard in 1853. We have since evolved into a comprehensive heavy industry manufacturer that can contribute to social progress by relentlessly pursuing technological excellence and by cultivating advanced engineering capabilities.

Accommodating Diverse Needs

The global business landscape is transforming at lightning speed. The global economy has become increasingly more complicated as the economic climates of emerging nations have diversified, international economic partnerships have progressed, and as the industrial structure has changed. Swift progress in information technology has made it even more important to be innovative in our products and services offering, while incorporating information and communication technologies that keep pace with advancements in manufacturing. Social infrastructure demands are diversifying around the globe. The focus for emerging nations is to tackle urbanization and industrialization. The priorities for developed countries include addressing the challenges of population decline and aging infrastructure. It is more important than ever for IHI to identify and cater to the diversifying customer value requirements that stem from such transformations in our operating climate.

Initiatives to strengthen our earnings foundations

We deployed Group Management Policies 2016 against this backdrop. Through this initiative, we seek to create a structure to reinforce business strategy implementation and ensure consistent profitability in construction. We also aim to supply solutions that create customer value and deliver advanced products and services so we can strengthen our earnings foundations. We are therefore prioritizing the following three initiatives in our drive toward tomorrow:

- Accelerate business concentration and selection by undertaking new portfolio management approaches to clarify the direction of business strategies
- Enhance estimate processes and risk reviews as part of efforts to strengthen the project implementation structure, creating a setup that enables us to stabilize earnings
- Employ shared Group functions that we reinforce by concentrating resources and integrating capabilities, thereby transforming our business model while making our operations more competitive

Realize your dreams

Our management principles are “Contribute to the development of society through technology” and “Human resources are our single most valuable asset.” Our corporate message of “Realize your dreams” epitomizes the mission we embarked on more than 160 years ago to leverage our technology and human resources to help humankind’s greatest dreams come true.

We look forward to your ongoing support and encouragement as the IHI Group endeavors to fulfill its mission by growing sustainably and enhancing corporate value while building trust among all of its stakeholders.


IHI Group Vision

The IHI Group seeks to solve the various environmental, industrial, social, and energy related problems of the 21st century, through using engineering expertise to focus on “Monozukuri” technology. In striving towards these goals, IHI is becoming a global enterprise offering the safety and security for the benefit of both the environment and humanity.

Overview of Group Management Policies 2016

Group Management Policies 2016

Strengthening our earnings foundations

Pressing issues

Reform corporate culture

Reform quality and business systems to reinforce manufacturing capabilities

Issues

Group Management Policies 2016

Selection and concentration through new portfolio management

Secure stable project earnings

Identify and deliver customer value

Platform for strengthening earnings foundations

Grow sustainably and enhance corporate value

Business Areas

Resource, Energy & Environment Business Area

Minimizing Environmental Impact

We maintain stable supplies of energy that are essential to industrial progress and comfortable lifestyles while aiming to minimize global warming. We leverage our expertise and proprietary technologies in coal, natural gas, nuclear power, and in renewables to optimize product and service mixes while minimally affecting the environment.

- Boilers
- Power system plants
- Large power systems
- Power systems for land and marine use
- Process plants
- Pharmaceutical plants
- Environmental response systems
- Nuclear energy
- Asian base EPC

Social Infrastructure & Offshore Facilities Business Area

Underpinning the Essentials of Modern Living

In social infrastructure, security, offshore and urban development, as well as in other fields, we leverage our technological capabilities and experience to ensure that nations and societies are safer and more secure.

- Bridges and watergates
- Shield systems
- Concrete construction materials
- Transport systems
- Urban development

Industrial Systems & General-Purpose Machinery Business Area

Transforming the World’s Industrial Infrastructure

We offer innovative systems/technologies and optimal solutions to help transform industrial infrastructure around the world. We are helping companies enhance manufacturing processes and create more sophisticated products so they can continue to satisfy their customers in the years ahead.

- Rotating machinery
- Turbochargers for vehicles
- Heat treatment and surface engineering
- Agricultural machinery and small power systems
- Transport machinery
- Parking
- Logistics and machinery

Aero Engine, Space & Defense Business Area

Opening New Horizons

We draw on world-class technologies and organizational strengths to help make air travel more comfortable and safer and better for the environment while expanding space exploration to benefit humankind.

- Aircraft engines
- Defense equipment and systems
- Rocket systems and space exploration

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IHI has four business areas, namely Resources, Energy & Environment Business Area; Social Infrastructure & Offshore Facilities Business Area; Industrial Systems & General-Purpose Machinery Business Area; and Aero Engine, Space & Defense Business Area. Its three shared Group functions are corporate business development & solution, intelligent information management, and global marketing & sales. We will properly identify diversifying customer value and strengthen collaboration on shared Group functions while both business operation divisions and the shared Group functions co-create values to accelerate a transformation of our business model and create customer value.

**Corporate Business Development & Solution**

Corporate business development & solution which is cross-department function resolves groupwide business issues and creates businesses in response to diversifying customer values and changes in the social environment. We accordingly develop businesses by combining products, services, and technologies of within and outside IHI group in light of market needs.

**Intelligent Information Management**

The shared function "intelligent information management" takes the lead in driving IHI’s digital transformations with business areas and strategic business units, using the Internet of Things, artificial intelligence, machine learning, and other advanced information and communication technologies. This function develops a common Internet of Things platform within the Group to provide predictive diagnostics and proposals on optimal operations and product designs and supply information related to customer product usage and operations. It aims to create new value with business areas and strategic business units through the sophistication of products, manufacturing, and services by harnessing information and communication technology.

**Global Marketing & Sales**

The global marketing & sales shared function accelerates the Group’s globalization and transforms its business models through direct and dynamic communication between domestic and overseas business units through integrated operations. Stronger collaboration with Business Areas through integrated marketing function and comprehensive sales accelerates formation of private-public projects and localization to create value with customers and secure quality orders that reflect a swift responsiveness from lifecycle perspectives.
Research and Development

The IHI Group has formulated a clear strategy to develop technologies by drawing on its collective strengths while sharing the medium- to long-term R&D direction throughout the Group.

This strategy focuses R&D based on the three megatrends of “Diversifying Social Infrastructure,” “Accelerating toward advanced information and communication era,” “Increasingly Complex Global Economy,” and also encompasses technological areas that are group-wide priorities.

Social development will be led by the efforts to increase the production efficiency, to reduce the environmental load, and to create new business model using advanced ICT. IHI Group continues to cultivate new contributions to society.

R&D underpins a technology-driven IHI Group.

Diversifying Social Infrastructure
- Energy-saving, environmental load-reduction, efficient and economic utilization of diversified energies.
- Solve issues involving the safety and security of social infrastructures as well as their life cycles.

Accelerating Toward Advanced Information and Communication Era
- Leveraging ICT to deliver high-value-added products and services, transform the business model, and undertake more sophisticated manufacturing.
- Promotion of open innovation. Engage in strategic intellectual property initiatives.

Increasingly Complex Global Economy
- Using robotics, the Internet of Things, and Artificial Intelligence to integrate predictive and learning technologies to materialize smart factories, systems, and societies that optimally accommodate demand and supply, climate change, and production efficiencies.

IHI Group Technology Focus Areas

Applied Technologies to Enhance Products and Services

Fundamental Technologies

Technology Focuses for the Future
- Developing core technologies and product lines for the hydrogen and ammonia value chains to cater for the needs of a low-carbon society.
- Using robotics, the Internet of Things, and Artificial Intelligence to integrate predictive and learning technologies to materialize smart factories, systems, and societies that optimally accommodate demand and supply, climate change, and production efficiencies.

R&D Topics

Application of deep-learning to logistic robots
Among the work in logistics, unloading corrugated cardboard boxes on a pallet (depalletizing) is such heavy work that its automation had been strongly requested. But the conventional robot systems needed detailed information of the boxes such as image data to be registered in advance, and this prevented the adoption of them.

IHI and IHI Logistics & Machinery Corp. worked with Kinema Systems Inc. (U.S. start-up) to successfully develop an deep-learning-based depalletizing system, without the advance registration of image data of cardboard boxes. In addition, based on a lot of data already learned, this system recognizes cardboard boxes with various kind of shapes and printed patterns. It enables flexible operations based on recognition using deep-learning, and this improves its performance.

Robotics change outdoor work sites
At outdoor work sites such as logistics, construction and civil engineering, human workers manually operate various machineries and vehicles. In recent years, these kinds of works require further security and safety at these sites, and at the same time, shortage of labor and skilled operators is getting more serious.

As a tackle on these social challenges, IHI is developing technology to retrofit remote control and autonomy capability onto such machinery and vehicles. It provides a system that can operate multiple machineries and vehicles with few operators from a safe operation room. Some part of the systems, based on the remote control, has already been put to practical use, and IHI also aims to commercialize the autonomous operation technology earlier by verifying the practicability of such technology at actual work sites.
Research on hydrogen energy produced from renewable energy

For realizing a low carbon society, people expect to effectively use carbon-free hydrogen produced from renewable energy. Although hydrogen does not emit CO2 when used, it is hard to be liquefied and is expensive in transportation and storage. IHI focuses on ammonia, whose transportation cost is relatively low as a hydrogen carrier, and aims to create a value chain from production to utilization. We have developed a technology to use ammonia as a fuel for power production in order to reduce CO2 emission. Because ammonia is difficult to be burned, burner design to co-fire ammonia directly with conventional fuels is the key technological point to achieve stable operation. This time, we have succeeded to co-fire ammonia with pulverized coal or natural gas in our test facilities for coal fired boiler burned, burner design to co-fire ammonia directly with conventional fuels is the key technological point to achieve stable operation. This time, we have succeeded to co-fire ammonia with pulverized coal or natural gas in our test facilities for coal fired boiler.

Ocean current power generation system: new renewable energy technology using the Kuroshio Current

In July 2017, IHI and the New Energy and Industrial Technology Development Organization (NEDO) have completed a 100kW class prototype subsea floating type ocean current power generation system “Kairyu,” which is a new renewable energy technology that utilizes the energy in ocean currents. In August, “Kairyu” was installed into the waters of the Kuroshio Current off the coast of Kuchinoshima, Kagoshima Prefecture and the demonstration test was conducted. Consequently, the world’s first subsea floating type ocean current power generation system succeeded to generate power from the Kuroshio Current. The demonstration test proved that “Kairyu” can display the performance as designed and that the subsea floating type ocean current power generation system can be operated and can generate power in the waters. We could acquire a lot of data and know-how for the future practical application.

Smart Factory

The IHI group is working on achieving a “smart factory” adapted to enhance factory productivity by fusing manufacturing technology and ICT together. The aims of this are: (1) to quickly grasp disturbance hampering production such as equipment failure to quickly take countermeasures against it; and (2) to improve output per person and equipment/energy utilization efficiency. For example, in a machine factory, by attaching various sensors to processing equipment to analyze data, the signs of failure can be detected in advance. Also, by attaching IC tags, etc. to various components, processing time and waiting time in each processing step, and who is in charge can be grasped without taking time and effort. Analyzing the resulting data allows us to work on identifying processing steps problematic for improving productivity and on effectively improving them.

Data analysis technology for utilizing ICT and IoT

The IHI group is advancing the sophistication of our products and services and manufacturing processes by collecting a lot of operating information on products delivered to our customers and on in-house equipment using our shared platform for utilizing ICT and IoT, called ILIPS (IHI group Lifecycle Partner System). We are developing failure sign sensing technology flexibly responding to changes in operating environment such as seasonal variations and a technology allowing anyone to utilize experts’ knowhow using AI/machine learning on the basis of text information such as maintenance records. We are further working on creating customer value, such as planning optimum maintenance/operation and proposing new business.
Technologies Supporting IHI Products

### Materials technologies
- Flow material development (lightweight / heat-resistant)
- Casting, forging, and powder metallurgy
- Material structure evaluation
- Strength properties and residual life evaluation
- Environment resistance evaluation

We are working on developing new materials aiming to reduce weight and improve heat resistance and on designing shaped material processes such as casting, forging, and powder metallurgy. We are also advancing the development of technology for evaluating a material residual life and the understanding of a material deterioration mechanism by aid of sophisticated analysis equipment.

### Vibration engineering and structural strength technologies
- Structural strength evaluation
- Structural test and measurement
- Fluid flow structural analysis
- Impact analysis / composite material analysis
- Stiffness-concrete evaluation
- Seismic resistance, seismic isolation, and vibration control

In the field of structural strength, structural analysis, and structural vibration technologies, we are working on the research and development of the evaluation of new material strength, new manufacturing processes, high-temperature strength prediction simulation, and also advancing the research and development of seismic resistance, seismic isolation, and vibration control technologies for supporting safety and security.

### Rotating machines and reciprocating engine technology
- Aircraft design
- Mechanical vibration and machine elements
- Tribology
- Performance measurement / element test
- Combustion / flow numerical analysis
- Combustion / flow visualization

We are contributing to increasing the efficiency of, improving the reliability of, and reducing the environmental loads of turbochargers, industrial compressors, zero-engines, gas turbines, diesel engines, gas engines, and so on using advanced numerical analysis technology, element test and measurement technology.

### Thermal fluid and combustion technologies
- Heat, fluid, combustion, and wind-tunnel testing
- Numerical analysis of heat transfer, phase change, multiphase flow, and combustion
- Heat and fluid measurement and control
- Next-generation energy

We are improving the performance of various types of equipment and developing new technology using new heat/flow-related numerical analysis technology and test/measurement/control technologies. We are also focusing on developing next-generation energy technology including hydrogen and renewable energies.

### Numerical analysis and optimization technologies
- Optimization
- Machine learning
- Mathematical modeling
- Large-scale parallel computation
- Multiscale analysis
- Multi-physics analysis

We are working on the research and development of a computational engineering method for performing efficient computation while faithfully reproducing a physical phenomenon on a computer, the latest optimization method, data mining based on machine learning, and a mathematical scientific method including mathematical modeling.

### Welding and joining technologies
- Arc welding and automation
- Laser processing
- Solid-phase joining
- Welding phenomena analysis
- Welding material and structural integrity
- Welding testing and evaluation

We provide a new joining process and new material welding technology to respond to the diversification of products and the adding of value to products. We also employ leading-edge measurement and observation technologies and evaluation methods even for conventional arc welding, and contribute to improving product quality and reliability using an autonomous process.

### ICT
- ICT technology
- Big data analysis technology
- AI and machine learning technology
- Sensing technology
- Communication and network technology
- Information security technology

ICT is indispensable for products and services of the IHI group as well as for the sophistication of manufacturing. We analyze a lot of operating data on production equipment and products delivered to customers in accordance with our uniquely developed algorithm to provide new value to customers.

### Control and electronics technologies
- Advanced control and optimization
- Embedded software
- Power electronics
- Motor electromagnetic field analysis
- High-speed analog circuit
- Secondary cell application

We are working on control and optimization technologies for taking out the performance of the IHI group’s wide range of products to the maximum extent possible, embedded software development for constructing control systems, as well as electric and electronic technologies applied with the latest power electronics, and energy technology.

### Mechanical system technologies and robotics
- Special production / FA system
- Undersea and marine instrument design
- Mechanical design for special and clean environments
- Manipulation
- Intelligent and autonomous machinery
- Sizing

We are developing IHI group’s production machinery, robot-based FA (factory automation) systems, and undersea and marine instrument on the basis of mechatronics and system engineering technologies. We are also advancing the research of next-generation robot technology.

### Energy and chemical process engineering
- Energy conversion and usage technology
- Catalyst creation and evaluation
- Process simulation
- Chemical reactor and culture apparatus design
- Application technology of algae and microorganisms
- Micronano applications and water treatment

We deploy energy and chemical processing technologies in fields ranging from plants to manufacturing facilities. We are developing core catalysts for these processes with reactor design technologies, and advanced process optimization technologies, as well as advancing a wide variety of technology development.

### Advanced production engineering
- Machining and plastic forming
- Coating, corrosion prevention, surface modification
- Composite material processing
- Non-destructive evaluation and measurement
- Production system

In order to innovate IHI group manufacturing, we are developing various processing technologies indispensable for manufacturing, evaluation and measurement technologies for ensuring quality, and a production system for optimizing the entire production process using the latest ICT technology.

### Applied physics and chemistry
- Electromagnetic field application
- Plasma application
- Quantum beam application
- Chemical application
- Functional material invention
- Nano / micro scale analysis and evaluation

We are researching and developing advanced technologies mainly in the fields of applied physics and applied chemistry, which will be useful for developing IHI group’s future products and making existing products competitive.
The IHI Group is committed to meeting the expectations and earning the trust of all stakeholders, from customers, business partners, shareholders, and colleagues to communities everywhere while closely monitoring global issues. In doing so, we seek to deliver more value in the years to come.

### CSR Structure

We established a CSR Committee in FY2013 to discuss and promote CSR-related matters, including basic Group policies and measures. The president chairs this committee, with the director in charge of CSR serving as vice chair. Committee members include directors and division heads.

In the years ahead, we will step up efforts to integrate CSR and management in business activities, in keeping with one of our key management principles of contributing to social development through technology.

### CSR in Business Activities

The IHI Group helps resolve social issues through monozukuri, the Japanese concept of meticulously planned and executed manufacturing. We developed four strategies to address key social issues, and are undertaking initiatives related to these strategies in each business area to resolve those issues.

#### Key Issues Addressed by IHI

<table>
<thead>
<tr>
<th>Key Issues Addressed by IHI</th>
<th>Business Areas</th>
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</thead>
<tbody>
<tr>
<td>Realize low-carbon societies and reduce environmental burdens</td>
<td>Resources Energy Environment, Social Infrastructure/Other Facilities, Industrial Systems, General-Purpose Machinery, Aerospace/Defense</td>
</tr>
<tr>
<td>Provide stable energy supplies</td>
<td>Resources Energy Environment, Social Infrastructure/Other Facilities, Industrial Systems</td>
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<tr>
<td>Responding to industrialization advancement and urbanization</td>
<td>Resources Energy Environment, Industrial Systems, Industrial Systems, General-Purpose Machinery, Aerospace/Defense</td>
</tr>
<tr>
<td>Develop medical, food and water solutions</td>
<td>Resources Energy Environment</td>
</tr>
</tbody>
</table>

#### Business Areas

- Resources Energy Environment
- Social Infrastructure/Other Facilities
- Industrial Systems
- General-Purpose Machinery
- Aerospace/Defense
- Promoting industrial advancement with new businesses

### Environmental Activities

Part of IHI’s mission is to reduce the environmental burden of its operations and protect the environment in whatever way possible. In FY2013, we formulated IHI Group Environmental Vision 2013 to guide our environmental efforts through FY2018. We are undertaking environmental initiatives under three-year plans to realize our vision.

**IHI Group Environmental Vision 2013 (FY2013 to 2018)**

IHI, as a responsible global group, strives to help preserve the global environment on a continuous basis through cooperation with customers and business partners around the world.

**Reduce environmental burdens through business activities**

The IHI Group provides a range of products and services that help reduce environmental impact. We have internally certified offerings with outstanding environmental performance, publicizing them through our websites and other channels. We have exhibited at Japan’s largest environmental exhibition, and have showcased products and services that help tackle climate change.

### Community Service

The IHI Group provides value to society by making employees aware that they are part of society and by extending CSR beyond its operations.

We undertake various community service based on five key themes.

#### Five key themes

- Nurturing future generations
- Promoting precision manufacturing and scientific technologies
- Supporting environmental sustainability
- Providing access to medical care, food and water
- Resolving problems in local communities

### Supporting Wheelchair Basketball

The IHI Group has been an official sponsor of the Japan Wheelchair Basketball Federation since 2015. We have held wheelchair basketball events for local residents at business sites around the nation, including exhibition matches and games for people to experience playing basketball in wheelchairs. We also provide facilities for practice and training camps. We will draw on our headquarters location in Tokyo, host of the 2020 Olympics and Paralympics, to contribute to the success of tournaments and the popularity of wheelchair basketball.

**CSR Information** [http://www.ihi.co.jp/csr/english/](http://www.ihi.co.jp/csr/english/)
Domestic Network and Main Works
As of March 31, 2018

Yokohama Works
Site Area 226,673m²
Products & Services
Reactor pressure vessels, containment vessels, heat exchangers for nuclear power plants, reactors and towers for chemical plants, steel structure, shield machines and industrial machinery
Certificates ASME (N, NPT , NA, NS, U, U2, S)
ISO 9001, ISO 14001

Kure Aero-Engine & Turbo Machinery Works
Site Area 47,797m²
Products & Services
Parts of gas turbine power plants, jet engines and gas turbines
Certificates JIS Q 9100 & JIS Q 9001 (ISO 9001)
JIS Q 14001 (ISO 14001)
JIS Q 27001 (ISO/IEC 27001)

Aichi Works
Site Area 733,767m²
Products & Services
Steel structures, offshore structures, and LNG tanks (SPB tanks)
Certificates ISO 9001

Aioi Works
Site Area 183,823m²
Products & Services
Boilers, LNG tanks, pressure vessels for chemical plants, prefabricated piping systems and casting products for machinery
Certificates ISO 9001
ISO 14001
ASME (S, U, U2)
Approval of Manufacturers

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Yokosuka IHI Bldg., 1-1, Toyosu 3-chome, Koto-ku, Tokyo 135-8710
TEL: +81-3-6204-7800

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IHI Akishima Bldg., 3-17-58, Haijima-cho, Akishima-shi, Tokyo 196-8686
TEL: +81-42-500-7250

Yokohama Engineering Center
1, Shin-Nakahara-cho, Isogo-ku, Yokohama-shi, Kanagawa 235-8501
TEL: +81-45-759-2111

Headquarters Representatives’ Office, Aioi District
520, Aioi, Aioi-shi, Hyogo 678-0041
TEL: +81-791-24-2206

Headquarters Representatives’ Office, Kure District
D-1, Showacho, Kure-shi, Hiroshima 737-0027
TEL: +81-823-26-2105

Corporate Research & Development
1, Shin-Nakahara-cho, Isogo-ku, Yokohama-shi, Kanagawa 235-8501
TEL: +81-45-759-2213
### Resources, Energy & Environment Business Area

**Aomori Plant Co., Ltd.**
- Manufacturing and sales of diesel engines and related equipment.

**Hamamatsu Works**
- Air Compressors, Motor, etc.

**Niimi Plant**
- Diesel engines, fuel injection equipment, etc.

### Social Infrastructure & Offshore Facilities Business Area

**Chiba Works**
- Manufacturing and maintenance of power generation facilities.

**Biwako Works**
- Manufacturing and maintenance of power generation facilities.

**IHI Construction Co., Ltd.**
- Engineering and construction of power generation facilities.

### Others

**IHI Business Support Corporation**
- Consulting and engineering services.

**IHI Inspection & Instrumentation Co., Ltd.**
- Inspections and measurements of plants and components.

**IHIInpex Corporation**
- Services related to the design, installation, maintenance and repair of industrial valves, and the industrial waste incineration facilities. And the waste management and parts supply of the municipal solid waste.

**IHI Plant Construction Co., Ltd.**
- Engineering and construction of power generation facilities.

**IHI Engineering Systems Co., Ltd.**
- Design, fabrication, construction, diagnosing, repair, and conservation of bridges, floodgates, and other civil structures.

**IHI Infrastructure Systems Co., Ltd.**
- Design, fabrication, construction, diagnosing, repair, and conservation of bridges, floodgates, and other civil structures.

### Industrial Systems & General-Purpose Machinery Business Area

**CENTRAL CONVEYOR COMPANY LTD.**
- Engineering, manufacturing and selling of elevator equipment and related machinery.

**IHI Turbo Co., Ltd.**
- Repair, design, manufacturing, sales and services of other machinery.

**IHI Ayato Tech Corporation**
- Engineering and manufacturing of small engines and agricultural machinery.

**IHI Transport Machinery Co., Ltd.**
- Design, development, manufacture, sales, leasing, installation, maintenance, remodeling and operation and management contracts of public transport systems and related facilities.

### Aero Engine, Space & Defense Business Area

**IHI Aero Manufacturing Co., Ltd.**
- Manufacturing and sale of aircraft engines and space development.

**IHI AEROSPACE ENGINEERING CO., LTD.**
- Design, manufacture, sales and services of after-market turbochargers, etc.

**IHI Master Metal Co., Ltd.**
- Design and sale of precision casting materials and special alloys and other products.

### Products & Services

- Products & Services
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**IHI Plant Engineering Corporation**
- Design, fabrication, construction, repair, maintenance, and conservation of transportation, communication, electrical, mechanical machinery, and information processing installations.

**IHI Precision Co., Inc.**
- Design and sale of injection equipment for diesel engines (vehicle, power plants).

**IHI Master Metal Co., Ltd.**
- Design and sale of precision casting materials and special alloys and other products.
Global Network and Works of Overseas Affiliates

**Overseas Representative Offices**

**REGIONAL HEADQUARTERS**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**RESOURCES, ENERGY & ENVIRONMENT BUSINESS AREA**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**REGIONAL COMPANIES**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**Regional headquarters**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**Regional companies**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**Resources, Energy & Environment Business Area**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**Regional headquarters**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**Regional companies**
- CHINA/ IHI (Shanghai) Management Co., Ltd.
- CHINA/ IHI Ltd.

**EUROPE, MIDDLE EAST**

**Regional companies**
- SINGAPORE/ IHI-ICR, LLC (U.S.A.)
- SINGAPORE/ IHI Turbo America Co. (U.S.A.)
- SINGAPORE/ IHI E&C International Corporation
- SINGAPORE/ IHI Power Generation Corp.
- SINGAPORE/ IHI INC.
- SINGAPORE/ IHI Europe Ltd.
- SINGAPORE/ IHI Management Co., Ltd.
- SINGAPORE/ IHI PHILIPPINES, INC.

**PACIFIC**

**Regional companies**
- SINGAPORE/ IHI-ICR, LLC (U.S.A.)
- SINGAPORE/ IHI Turbo America Co. (U.S.A.)
- SINGAPORE/ IHI E&C International Corporation
- SINGAPORE/ IHI Power Generation Corp.
- SINGAPORE/ IHI INC.
- SINGAPORE/ IHI Management Co., Ltd.
- SINGAPORE/ IHI PHILIPPINES, INC.

**AMERICAS**

**Regional headquarters**
- SINGAPORE/ IHI-ICR, LLC (U.S.A.)

**Regional companies**
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- SINGAPORE/ IHI Turbo America Co. (U.S.A.)
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**Resources, Energy & Environment Business Area**
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- SINGAPORE/ IHI Turbo America Co. (U.S.A.)
- SINGAPORE/ IHI E&C International Corporation
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- SINGAPORE/ IHI INC.
- SINGAPORE/ IHI Management Co., Ltd.
- SINGAPORE/ IHI PHILIPPINES, INC.

**EUROPE, MIDDLE EAST**

**Regional companies**
- IHI Charging Systems International S.p.A. (ITALY)
- IHI Charging Systems International GmbH (GERMANY)
- IHI Charging Systems International Netherland B.V.
- IHI Charging Systems International A.G.
- IHI Charging Systems International S.p.A.

**Resources, Energy & Environment Business Area**
- IHI Charging Systems International S.p.A. (ITALY)
- IHI Charging Systems International GmbH (GERMANY)
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- IHI Charging Systems International A.G.
- IHI Charging Systems International S.p.A.

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- IHI Charging Systems International S.p.A.

**ASIA**

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- IHI Charging Systems International A.G.
- IHI Charging Systems International S.p.A.

**ACHIEVEMENTS**

- Certificates ISO 9001
- Services
- Products & Site Area 140,000m²
- Certificates ISO/TS 16949, ISO 14001, ISO 50001
- Services
- Products & Site Area 250,000m²
- Certificates IATF 16949, ISO 14001, OHSAS 18001
- Services
- Products & Site Area 18,900m²
- Certificates IATF 16949, ISO 14001, OHSAS 18001
- Services
- Products & Site Area 20,000m²
- Certificates IATF 16949
- Services
- Products & Site Area 64,750m²
- Certificates ISO/TS 16949, ISO14001, OHSAS 18001
- Services
- Products & Site Area 16,000m²
- Certificates FAA Repair Station
- Services
- Products & Site Area 3,305m²
- Repair of jet engine parts and accessories
- FAI Repair Station

**Products & Services**
- Boilers, steel structures, container cranes, piping and pressure vessels, HRSG
- ISO 9001-2015, ASME (S, U, PP, R)
- OHSAS 18001
- Automotive turbochargers
- ISO/TS 16949, ISO 14001
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- ISO/TS 16949, ISO 14001
- OHSAS 18001
- Automotive turbochargers
- ISO/TS 16949, ISO 14001
Our products underscore our management philosophy of contributing to the development of society through technology.

### Historical Highlights

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1853</td>
<td>Ishikawajima Manufacturing Shipyard established to protect against invasion of western countries, after a fleet under U.S. Commodore Mathew Perry arrived</td>
</tr>
<tr>
<td>1866</td>
<td>Completed the Chiyoda Maru, Japan’s first steam-powered warship</td>
</tr>
<tr>
<td>1876</td>
<td>Established Ishikawajima Hirano Shipyard</td>
</tr>
<tr>
<td>1897</td>
<td>Established Harima Dock Co., Ltd.</td>
</tr>
</tbody>
</table>

**IHI**

IHI helped pioneer Japan’s heavy industry. We started out by accumulating shipbuilding technology that we applied to industrial machinery, plant manufacturing and construction. Now we are a key provider of massive elements of industrial and social infrastructure. Our products underscore our management philosophy of contributing to the development of society through technology.

### IHI Corporation

<table>
<thead>
<tr>
<th>Year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>Ishikawajima-Harima Heavy Industries was established to protect against invasion of western countries, after a fleet under U.S. Commodore Mathew Perry arrived</td>
</tr>
<tr>
<td>1961</td>
<td>Completed steel structures for Tokyo Central Station (now Tokyo Station)</td>
</tr>
<tr>
<td>1897</td>
<td>Established Ishikawajima do Brasil Estabelecimentos in Brazil</td>
</tr>
<tr>
<td>1903</td>
<td>Established Ishikawajima-Harima Heavy Industries Co., Ltd.</td>
</tr>
</tbody>
</table>

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*The above-mentioned years without any remark mean years of establishment.*
Company Profile (as of March 31, 2018)

- Year of establishment: 1853
- Capital: 107,165 million yen
- Number of employees (on consolidated basis): 29,706
- Works: 7
- Branches in Japan: 8
- Overseas representative offices: 13
- Affiliated companies in Japan: 70
  - Subsidiary companies in Japan: 52
  - Affiliated companies in Japan: 18
- Overseas affiliates: 147
  - Overseas affiliated companies: 120
  - Associated companies overseas: 27

Business Index

Resources, Energy & Environment Business Area
- Boilers
- Gas turbines, Gas engines & Diesel engines
- LNG receiving terminal / storage tank
- Processing & Pharmaceutical plants
- Equipment for plants
- Environmental response systems
- Nuclear energy
- Propulsion systems

Social Infrastructure & Offshore Facilities Business Area
- Bridges, Water gates & Steel structures
- Transportation systems
- Shield tunneling machines & Concrete construction materials
- Urban development
- Security

Industrial Systems & General-Purpose Machinery Business Area
- Rotating machinery
- Turbodrivers
- Grid scale energy storage system
- Heat treatment and surface engineering
- Agricultural machinery, Small power systems, Life associated equipment, and Packaged boilers
- Transport machinery
- Parking
- Iron, Steel and Coke-making equipment
- Pulp & Paper machinery
- Logistics systems
- Rubber & Film molding equipment
- FA systems for the automobile industry

Aero Engine, Space & Defense Business Area
- Aircraft engines
- Rocket systems & Space exploration

Net Sales

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>Consolidated Net Sales (Millions of Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiscal 2017</td>
<td>1,590,333</td>
</tr>
<tr>
<td>Fiscal 2016</td>
<td>1,486,332</td>
</tr>
<tr>
<td>Fiscal 2015</td>
<td>1,539,388</td>
</tr>
<tr>
<td>Fiscal 2014</td>
<td>1,456,844</td>
</tr>
<tr>
<td>Fiscal 2013</td>
<td>1,304,038</td>
</tr>
</tbody>
</table>

Consolidated Sales by Business Areas in Fiscal 2017

- Resources, Energy & Environment: 31%
- Social Infrastructure & Offshore Facilities: 10%
- Industrial Systems and General-Purpose Machinery: 29%
- Aero Engine, Space & Defense: 29%

Note: The total may not be 100% owing to the exclusion of “Other” and “Adjustments”.
Resources, Energy & Environment Business Area

Boilers
IHI has supplied the world with highly efficient and reliable coal-fired boilers that draw on its advanced technologies. With boilers based on our Clean Coal Technology, we contribute to the effective and economical use of valuable energy resources. We will continue to provide models employing coal and other fuels to customers around the world. We are augmenting flue gas treatment systems by pushing ahead with development to rapidly commercialize oxy-fuel combustion technology and CO₂ chemical absorption technology that lowers carbon dioxide emissions. We are also working on gasification and pre-dry technologies for lignite, a low-grade coal.

LNG receiving terminal / storage tank
IHI is Japan's leading provider of LNG receiving terminals and storage tanks. We are also active overseas, with a strong track record in India, Qatar, Mexico, Taiwan, the United States, and China. Particularly for LNG storage tank construction, we are able to handle all types of tanks including Double-walled metal tank, Pre-stressed concrete (PC) full containment tank and In-ground membrane tanks, with leading global market shares for such facilities.

Processing & Pharmaceutical plants
In such diverse areas as natural liquefaction plants and oil refining, petrochemicals, LPG, and other process plants, and pharmaceuticals plants, we have a strong track record in Japan and internationally in integrating everything from construction engineering to equipment procurement, construction, and startups.

Equipment for plants
We provide an array of plant equipment, including heating furnaces, cooling towers, and chemical plant reactors.
Environmental response systems
Our systems contribute greatly to environmental protection and remediation. We draw on our technologies and experience in waste management and materials recycling to provide engineering, construction, operation and maintenance services for waste and industrial effluent as well as public sewage treatment facilities. IHI has a strong history in providing flue gas desulfurization and denitrification facilities for thermal power stations and industrial plants.

Nuclear energy
IHI supplies such key components as reactor pressure vessels, primary containment vessels, and piping systems. We develop and construct nuclear fuel cycle systems as well as supply components for conventional boiling-water reactors (BWRs) and advanced boiling-water reactors (ABWRs). We also supply equipment for pressurized-water reactors (PWRs). Moving forward, we plan to engage in decontamination and decommissioning of nuclear power facilities.

Propulsion systems
Our Z-PELLER® is the most propulsion system in the global tugboat market, and has earned an outstanding customer reputation for its high quality and durability. The diverse other applications for this system include fireboats, oil skimmer boats, and other disaster prevention vessels, as well as floating cranes, dredgers, drill rigs, and support vessels.

Social Infrastructure & Offshore Facilities Business Area
IHI has constructed numerous major bridges worldwide. Included are the Seto Ohashi Bridges and the Akashi Straits Bridge in Japan, the Second Bosphorus Bridge and the Golden Horn Bridge in Turkey, the Campinna Bridge in the United States, and the Binh Bridge and the Nhat Tan Bridge in Vietnam. We are Japan’s top manufacturer of water gates for rivers and dams. Our capabilities extend from manufacturing and installation to inspection and maintenance. We contribute to water usage and flood control projects in Japan and overseas, particularly in Southeast Asia. We deliver large steel structures incorporating machinery and put a focus on the increase of hybrid structures, including caissons and pontoons that combine the strength of steel and concrete. We have integrated steel structures, mechanical, sensor, control, and other technologies to develop active mass dampers and seismic isolation floor systems. These systems serve important disaster prevention roles in high-rise buildings and computer centers.

Bridges, Water gates & Steel structures
IHI has constructed numerous major bridges worldwide. Included are the Seto Ohashi Bridges and the Akashi Straits Bridge in Japan, the Second Bosphorus Bridge and the Golden Horn Bridge in Turkey, the Campinna Bridge in the United States, and the Binh Bridge and the Nhat Tan Bridge in Vietnam. We are Japan’s top manufacturer of water gates for rivers and dams. Our capabilities extend from manufacturing and installation to inspection and maintenance. We contribute to water usage and flood control projects in Japan and overseas, particularly in Southeast Asia. We deliver large steel structures incorporating machinery and put a focus on the increase of hybrid structures, including caissons and pontoons that combine the strength of steel and concrete. We have integrated steel structures, mechanical, sensor, control, and other technologies to develop active mass dampers and seismic isolation floor systems. These systems serve important disaster prevention roles in high-rise buildings and computer centers.

Main Products
- Waste treatment facilities
- Biomass treatment facilities
- Flue gas treatment facilities
- Wastewater treatment facilities

Main Products
- Components for nuclear power plants
- Pressure vessels
- Azimuth Thruster (Z-PELLER®)

Main Products
- Composite slabs
- Sound-absorbing panels
- Temporary assembling bridges
- Caissons
- Seismic isolation floor systems

Main Products
- Bridges
- Water gate equipment for rivers
- Water gate equipment for dams
- Floating breakwater
- Floating platforms
- Immersed tunnels
- Hybrid caissons

Main Products
- Base plates
- Composite slabs
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Transportation systems
IHI contributes to traffic safety, which is essential for daily life, in various ways. Furthermore, we supply various railway systems, including ultra-low floor streetcars, which are human- and environment-friendly and essential for building new towns, diesel cars to ensure local traffic, and maintenance vehicles to keep railway systems running.

Urban development
We optimize the potential of our real estate holdings by redeveloping company offices and housing nationwide. We engage in leasing and sales, particularly in metropolitan Tokyo. A good example of this approach is in Toyosu, known for former shipbuilding yards, where we are undertaking a massive urban redevelopment project. We also prioritize using idle land, as part of which we operate Japan’s biggest mega solar generating business, in Kagoshima, thereby contributing to environmental and social sustainability.

Main Products
- Transportation systems
- Rolling stock
- Exception
- Maintenance vehicles

Joint housing business with major developer

Main Products
- Real estate leasing and sales

Main Products
- 3D laser radar systems
- X-ray inspection systems
- Monitoring equipment
- Oil leak monitors
- Noise reduction systems
- Disaster prevention equipment
- Weather observation system

Security
IHI provides various products based on mechatronics and sensor technologies. IHI’s 3D Laser Radar is installed as an obstacle detection system at railway level crossings and Driving Safety System Sensor for road infrastructure. To-date, over 2,000 3DLR units have been supplied worldwide and IHI continues exploring future sensor business fields.

IHI also supplies large X-ray visual inspection systems for cargo containers, for which IHI is the domestic market leader. We have ample track record for airports and seaports custom checks including small and mediumsized X-ray inspection system.

Main Products
- 3D laser radar systems
- X-ray inspection systems
- Monitoring equipment
- Oil leak monitors
- Noise reduction systems
- Disaster prevention equipment
- Weather observation system

Main Products
- Transportation systems
- Segment
- Automatic segment assembling systems
Rotating machinery  
IHI provides an array of compact and packaged machinery for plant utilities. Our offerings include separators, filters, deaerating equipment, and air compressors. We draw on many years of expertise from custom-manufacturing compressors, and our liquefied natural gas BOG plant compressors dominate the market. Our organic rankine cycle power generator can produce electricity from water with temperatures ranging from 70°C to 90°C, helping customers to conserve and create energy.

Turbochargers  
IHI supplies a wide range of turbochargers from large ones for land and marine power generators to small ones for automobile engines, and has already produced more than 50 million turbochargers for vehicles. We have development, production, and sales bases also in the U.S., Europe, Thailand, China, and Korea and are growing our business worldwide.

Grid scale energy storage system  
IHI provides turnkey solutions for grid scale energy storage system, centered on its ESWare suite of advanced control systems.  
(1) Analysis:  Evaluating project profitability before project deployment and optimizing system configuration  
(2) Control:  Managing systems in real time in line with customer requests and optimization directives  
(3) Optimization:  Formulating operational strategies to optimize profitability based on past operational results and weather, load, and other forecasts

Heat treatment and surface engineering  
Heat treatment processes and equipment are used in many industries. IHI supplies an array of equipment to meet user needs. Our heat treatment equipment offerings include vacuum heat treatment furnaces, high pressure dewax sintering furnaces, hot presses, high purification furnaces, vacuum carburizing furnaces, and vacuum vapor degreasers. In addition to supplying equipment, IHI itself maintains a heat treatment processing business. We also supply PVD/PACVD/CVD coating equipment using plasma technologies and are engaged in state-of-the-art thin film coating and surface-treatment business, where we provide coatings for cutting tools, dies, automobile parts, industrial machinery parts, decorative parts and medical equipment, and MScatCoating®, an innovative technology that uses an electrode discharge process.

Agricultural machinery, Small power systems, Life associated equipment, and Packaged boilers  
IHI supports agriculture with machinery for cultivating, fertilizing, seeding, harvesting, and other tasks. Our lawn maintenance machines, grass cutters, and campus greening equipment help maintain landscapes and lawns at an array of sports facilities. They include golf courses, soccer, baseball, and athletic fields, and racecourses. Our equipment is also utilized heavily at schools, parks, riverbanks, and homes. Our products serve in hospitals, clinics, nursing homes, hotels, restaurants, airports, train stations, and factories. We manufacture ozone deodorizers and disinfectors, accommodating rising demand for deodorization, sanitation, dust removal, and cleaning applications. In addition, we are accommodating diverse customer needs by supplying compact packaged boilers that deliver heat and steam to factories and other facilities.
Transport machinery
IHI has remained a technology leader in this field for a century. We accommodate needs ranging from under one metric ton to thousands of metric tons. Our offerings include bulk handling systems, such as port unloaders. Through standardization, we have increased economy with jib and overhead travelling cranes for various industries. We leverage advanced technologies in manufacturing through maintenance and modifications. We are a top supplier of jib climbing cranes for skyscraper and dam construction.

Main Products
▪ Unloaders
▪ Coal unloading and transportation facilities
▪ Overhead travelling cranes
▪ Jib cranes
▪ Jib climbing cranes
▪ Hoists

Parking
Since installing Japan’s first tower parking system in 1962, IHI has drawn on its experience, reliability, and proprietary technology to perfect these products. We link to introducing parking systems with smaller environmental footprints as well as other new types of parking system. We will continue to provide optimal parking solutions in the years ahead.

Main Products
▪ Parking systems

Iron, Steel and Coke-making equipment
PWHi offers state-of-the-art technologies for the primary stage of integrated steelmaking (mainly blast furnaces and coke oven plants), ranging from engineering to a full spectrum of EPC (Engineering, Procurement and Construction). Since 1941, IHI has built and relieved over 80 blast furnaces plants in and outside of Japan. Backed by a wide range of experience of Paul Wurth Group (Luxembourg), a number of our coke oven plants have been adopted by Japanese customers.

Main Products
▪ Industrial furnaces

Pulp & Paper machinery
IHI is Japan’s premier maker of pulp and paper manufacturing machinery, supplying papermakers with the largest and fastest paper-making and paper-coating machines. We have an unmatched record overseas as well as in Japan.

Main Products
▪ Pulp & Paper machinery

Logistics systems
IHI pioneered and is a leading company in numerous areas of logistics such as automated storage and retrieval system (ASRS), transportation, and sorting systems. Our ASRS can be used at temperatures as low as -40°C, or store hazardous materials. We also provide storage, transportation equipment for clean rooms, and the world’s first artificial intelligence-loaded de-palletising robotics system for logistics, food, chemicals, and diverse other industries. We draw on our expertise to provide comprehensive logistics solutions.

Main Products
▪ Automated material handling systems in clean room
▪ Transportation systems
▪ Sorting / picking systems

Rubber & Film molding equipment
Our Calender lines are used for manufacturing plastic films and rubber sheets mainly for tires. IHI continues to build on its strong record in these fields worldwide, and continues to improve productivity through introducing our unique thickness control technology and automation technologies.

Main Products
▪ Rubber and film molding equipment (calender)

FA systems for the automobile industry
High-speed tandem press lines are essential to form automobile bodies and chassis. Our factory automation (FA) systems, including our high-speed transfer feeders, hybrid regenerative cushion systems, destack feeders, panel racking systems, automatic die change systems, total line controls and other FA systems, ensure the world’s fastest productivity with less energy consumption considering the environment.

Main Products
▪ High-speed transfer feeder (V-feeder)
▪ Hybrid regenerative cushion system
Aero Engine, Space & Defense Business Area

Aircraft engines

IHI is Japan’s leading maker of jet engines, with a market share of between 60% and 70%. We are the primary contractor and manufacturer for aircraft engines used by the Ministry of Defense. We collaborate in international projects to develop and supply large and small engines for all types of civilian aircraft. We have leveraged our experience and manufacturing technologies to provide maintenance for all types of engines. We are considered Asia’s core maintenance center. To meet the growing demand for eco-friendly engines and fulfill our corporate responsibility, we are developing next-generation engines that draw on our advanced technologies.

Rocket systems & Space exploration

IHI has participated in Japan’s space development effort from the outset. We have applied our cryogenic-pump and turbomachinery and other technologies to develop and manufacture the turbopumps and gas-jet systems crucial to successful rocket launches. Our involvement in Japan’s space program expanded significantly in 2000, when we acquired Nissan Motor’s Aerospace Division, a pioneer in solid-fuel rocket development in Japan. We play an important role in developing and constructing the Exposed Facilities of the KIBO Japanese Experiment Module, which is a part of the International Space Station program. We support experiments in space by supplying experimental systems needed for cooperative international projects.
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