



JFE

JFE Group

IT REPORT

2019

Contributing to society with the world's most innovative technology



2019
攻めのIT経営銘柄
Competitive IT Strategy Company

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Name J. Mirai

J. “J” as in “JFE”

Mirai “Mirai” presents a neutral image and is easy for Japanese and non-Japanese speakers to pronounce.

It conveys the JFE Group’s idea of “Wanting to make the future better.”

Competitive IT strategy to improve productivity and competitiveness exponentially, create new value and contribute to society

Through our corporate vision of “contributing to society with the world’s most innovative technology,” the JFE Group is striving for sustainable growth and enhancement of corporate value.

Based on this corporate vision, the Group is working as one, strategically focusing on growth fields, to meet the increasingly sophisticated and diverse needs of society. Our main area of activity is in the proactive use of advanced IT, encompassing data science technologies such as artificial intelligence (AI), the internet of things (IoT) and big data and robotics. At the same time, we are driving business reforms by upgrading our mission-critical systems at steelworks and other legacy systems. By pursuing this competitive IT strategy, we will comprehensively strengthen our capabilities in technology, sales and business management, develop products and technologies that address the needs of society and our customers, and drastically raise productivity, while, at the same time, strengthening our human resource development including the passing on of engineering skills.

Furthermore, in 2016 the JFE Group established a dedicated unit, JFE-SIRT*, to reinforce information security governance. We have designated information security, to protect the information assets of all Group companies from the risks of increasingly sophisticated and complex cyberattacks and information leakages, as one of our most important management issues, and are pursuing swift and comprehensive risk responses.

As you review this report on the strategic IT initiatives of the JFE Group, I hope you find the information useful and gain a deeper understanding of our corporate group’s IT initiatives.

*JFE-SIRT: JFE-Security Integration and Response Team



Hiroyuki Fujiwara
Senior Vice President
JFE Holdings, Inc.

Disclaimer
Current plans, strategies, beliefs, and other content described in this report that are not historical facts are forward-looking statements that may involve risks and uncertainties. Actual results, performance, or achievements could differ significantly from the anticipated outcomes presented in this report due to various factors, including changes in the global or domestic economy, as well as unanticipated trends in the industries to which JFE Group companies belong. Readers should understand that JFE Holdings cannot guarantee the certainty of such forward-looking statements.

Selected as a “Competitive IT Strategy Company”
for five consecutive years

JFE Holdings has been selected as a Competitive IT Strategy Company in the steel industry for five years in a row. These companies are selected by the Ministry of Economy, Trade and Industry and the Tokyo Stock Exchange among all listed companies as names that are proactively implementing competitive IT strategies, as a way to promote the strategic use of information technology (IT) by Japanese companies.

The proactive use of cutting-edge IT to meet the needs of society and pursue a growth strategy is one of the major initiatives included in the JFE Group’s sixth medium-term business plan, formulated in April 2018, and we are carrying out various activities to this end.



Hideo Kasuya
General Manager,
ICT Center,
JFE Engineering

Akira Nitta
Vice President,
JFE Steel

Tatsuya Sakamoto
Vice President,
JFE Shoji Trade

Activities as a Competitive IT Strategy Company

| Year | Project | IT application |
|--------------------------------|---|---|
| 2015 (1 st year) | J-Smile® (Sales of steel products) | Established change-tolerant information structure based on data-oriented approach |
| | Standardization system for overseas downstream processes | Used ERP and cloud to standardize operations and systems globally |
| | J-Flessa® (Sales and production of steel products) | Enhanced ability to formulate plans using dedicated software package Connected planning data and evaluation data from peripheral systems using service-oriented architecture |
| | Sharing of new sales information | Used cloud and social media to manage customer information centrally and share information across departments |
| 2016 (2 nd year) | Innovation of steelworks business processes | By upgrading mission-critical systems at steelworks, innovated business processes to increase efficiency |
| | System for remote monitoring and operation support at plant facilities | Created system that makes optimal operation support at plant facilities and optimal adjustment of power supply and demand possible |
| 2017 (3 rd year) | Use of digitalization technologies to innovate maintenance of steelmaking equipment | Used technologies including artificial intelligence (AI) and big data to innovate maintenance of steelmaking equipment |
| | Introduction of AI to operate and manage waste-to-energy plant | Used AI to strengthen stable, safe, optimal operation |
| 2018 (4 th year) | Sophisticated supply chain linkage across the JFE Group | Achieved digital manufacturing within the Group by virtually integrating JFE Steel and JFE Shoji Trade |
| | Use of AI to innovate remote monitoring and operation support at plants | Established the Global Remote Center using AI to integrate remote operation support at each plant |
| 2019 (5 th year) | Integration of maintenance systems and use of sophisticated ICT at steelmaking facilities | Introduced J-mAlster® system to support the recovery from control failures |
| | Use of data analysis platform to train plant engineers to be data scientists and improve operational efficiency | Created the Pla'cello data analysis platform that makes it possible to detect signs of abnormalities and predict demand |

Initiatives as
a 2019 Competitive IT Strategy Company

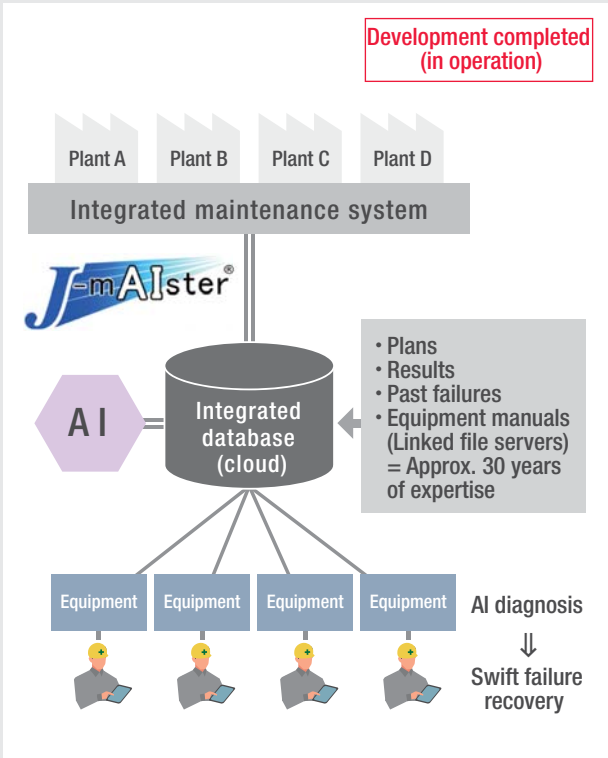
Integration of maintenance systems and use
of sophisticated ICT in steelmaking facilities

In addition to opportunity loss in manufacturing and shipments, problems with steelmaking facilities can disrupt supply chains, having a major impact on customers’ businesses. We consider the minimization of the effect of equipment failures to be an important management issue.

Previously, maintenance personnel referred to various manuals and past examples to identify the cause of equipment failures, or relied on the expertise and judgment of veteran engineers. As these veterans age, quickly passing on their engineering skills and knowledge and training younger engineers have become a particularly pressing issue for improving our ability across workplaces to address failures.

Given this situation, the J-mAlster®* system to support the recovery from control failures was introduced in 2017 (the first among Japanese steelmakers) by converting these various manuals and maintenance records that include the experience and expertise of veteran engineers into databases and applying AI technologies to these stores of data, to make it possible for maintenance staff to search efficiently for useful information to recover from failures. The rollout of the system to all manufacturing lines was completed in fiscal 2018.

* J-mAlster®: JFE Maintenance AI of Smart TPM for Electric Repairs



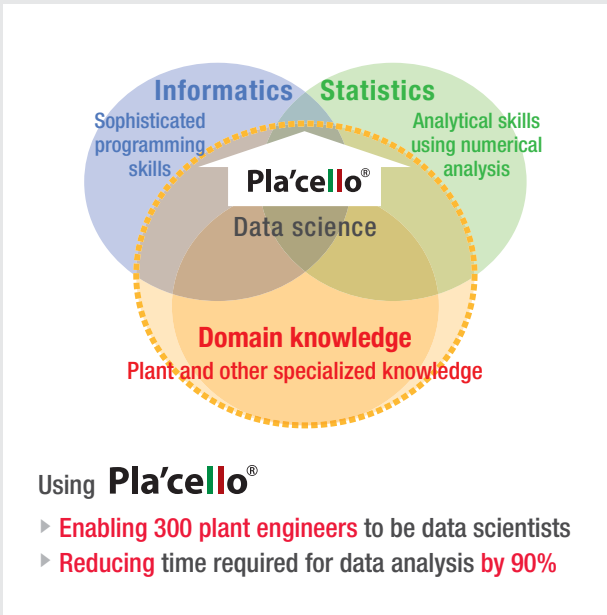
Use of data analysis platform to train plant
engineers to be data scientists and improve
operational efficiency

To utilize AI and big data analysis in plant design and operations in general, the plant domain knowledge of plant engineers is required in addition to the advanced knowledge in informatics and statistics.

In November 2018, JFE Engineering built and started operating the Pla'cello data analysis platform that makes it possible to do tasks such as “detect signs of abnormality” and “predict demand” even without “advanced data analysis knowledge.” This allows the company’s engineers with plant domain knowledge to analyze data using an intuitive “drag and drop” process.

There were many cases when data analysis took as long as one week when general spreadsheet software was used for data analysis. Pla'cello makes it easy to analyze operations, detect warning signs, predict demand and diagnose images, reducing the time required for data analysis-related operations by up to 90%. More than 100 employees have used the platform during its first four months of operation, and JFE Engineering aims to increase the number of its internal engineers engaged in data science to 300 by the end of fiscal 2020.

In addition to time-series data analysis at plants, Pla'cello can be used in a range of situations including integrated parts and material management between facilities and work sites (IoT technology) and to visualize management information. We are working to expand the platform’s functionality further and apply it to various Group operations.



The JFE Group's RPA initiatives

As one way to reform work styles, the JFE Group has been studying the introduction of Robotics Process Automation (RPA) at JFE Steel, JFE Engineering, and JFE Shoji Trade since fiscal 2017.

Currently (as of March 31, 2019), we have introduced RPA for approximately 400 operations groupwide and to date have eliminated approximately 40,000 working hours, making a significant contribution to enhanced productivity.

We are applying RPA in a wide range of sectors, from common administrative operations for finance, accounting, general affairs, and human resources to engineering support for manufacturing and design.

Going forward, we will continue to introduce RPA across the Group, to promote further innovation in business processes and operational efficiency.

Operations with RPA introduced

Approx. 400

Work hours eliminated

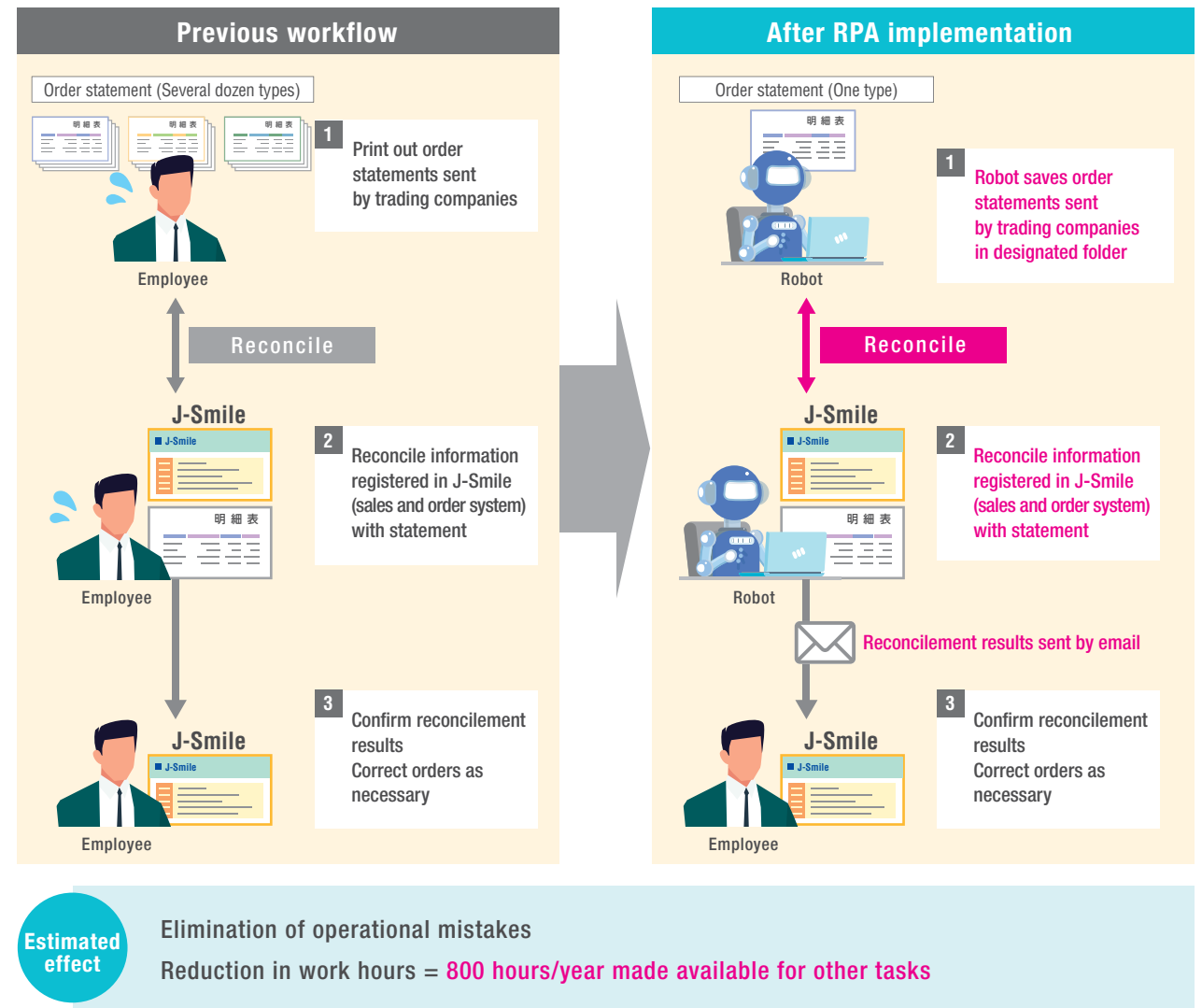
Approx. 40,000 hours

Introducing RPA—Example 1

JFE Steel Using RPA for reconciliation of order statements for steel sheet products for export

Operational revision: Standardized order statement formats that had previously differed by trading company

Operational efficiency: Using RPA to reconcile order statements with order information registered in the system

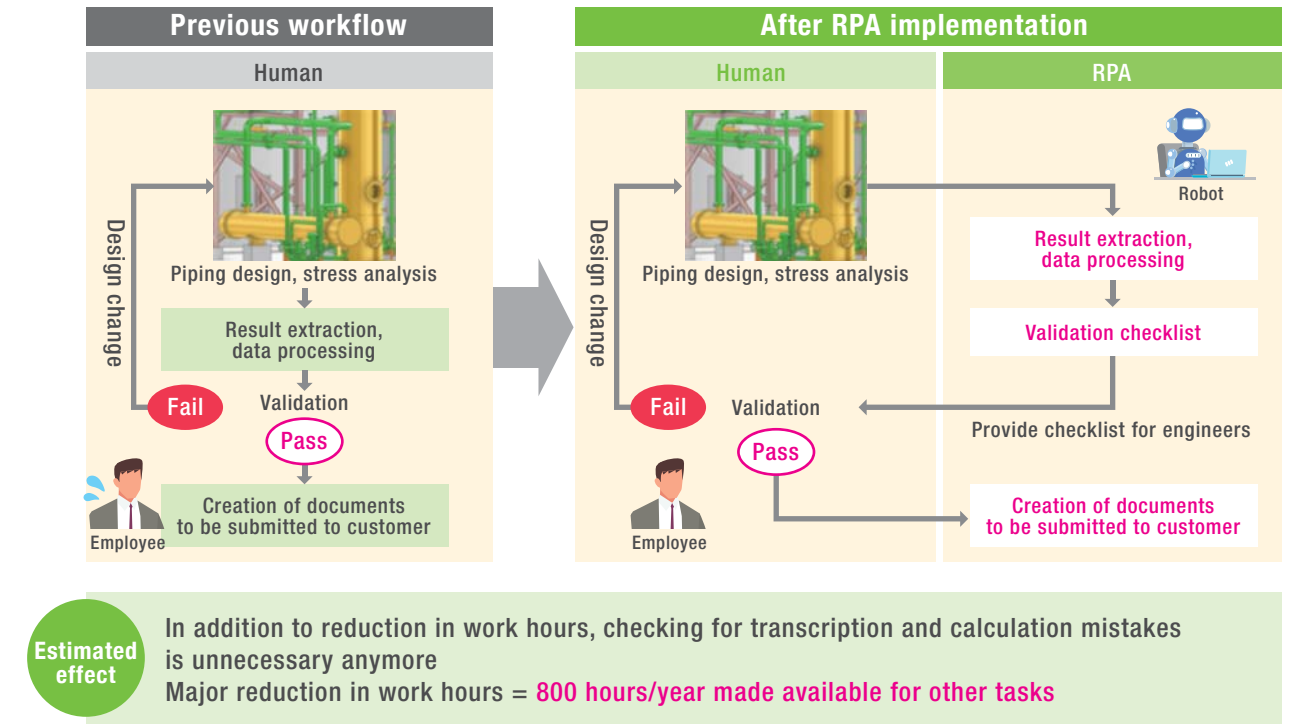


Introducing RPA—Example 2

JFE Engineering Using RPA for piping design

Use RPA to extract, process, and list huge amounts of data from stress analysis in piping design

Listing up of information required by designers achieves more efficient validation

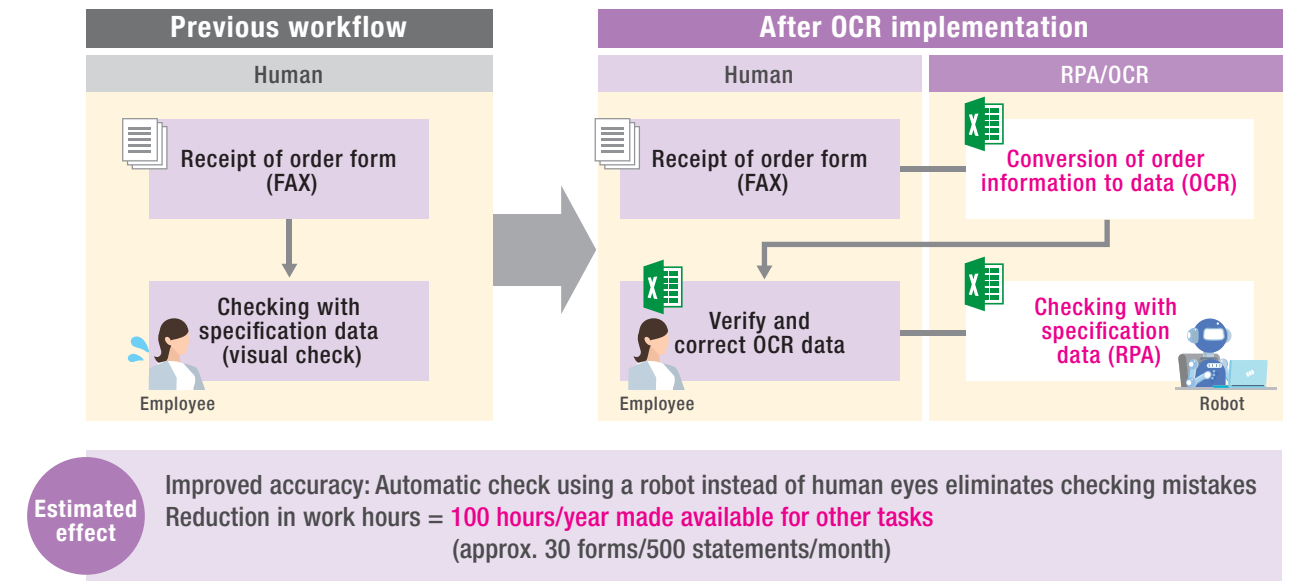


Introducing RPA—Example 3

JFE Shoji Trade Using OCR + RPA for specification number checking

Use OCR* to convert information to data for specification number checking (Fax order with control master), an operation that was previously done visually

Additionally, use RPA in subsequent processing to increase operational efficiency and quality



* OCR (Optical Character Recognition/Reader): Technology that uses a scanner or camera to read printed or handwritten text on paper and convert it to an electronic text code.

01 Steel Business

**Global leadership in IT,
creating customer-focused value,
and responding quickly to changes through
continuous reform and strategic IT**

Hironori Fukushima Senior Vice President



As a number of cutting-edge ICT solutions incorporated AI technology are commercialized these days, JFE Steel hopes to make business reforms by utilizing those solutions proactively. However, without being influenced by any uncertain or exaggerated information, our systems division needs to ascertain with certainty those solutions, particularly from the aspect of information security. Our mission is to achieve our sixth medium-term business plan by addressing issues with decisions and actions based on constantly ensuring that our systems are consistent with our customers' needs as well as our corporate management needs. This will result in the promotion of JFE Steel's DX (digital transformation).

JFE Steel's IT Vision and Three Strategic Themes



1 Execute IT structural reforms
Upgrade systems at steelworks
Realize a flexible, change-tolerant IT structure

2 Raise our level of IT use
Promote business reforms and the latest advancements in IT
Improve dramatically in speed of business operations

3 Reinforce our IT risk management
Enhance security and standardized controls
Enhance the security environment for IT

Synergistic effects



IT Innovation Leading Department

To address key business issues and also structural issues related to our business operations, our department works with other business divisions to facilitate the use of the latest ICT and to implement business reforms. This is competitive IT. We are also working to establish a secure IT environment in terms of infrastructure as well as application systems and then enhance this environment even further. This is defensive IT.



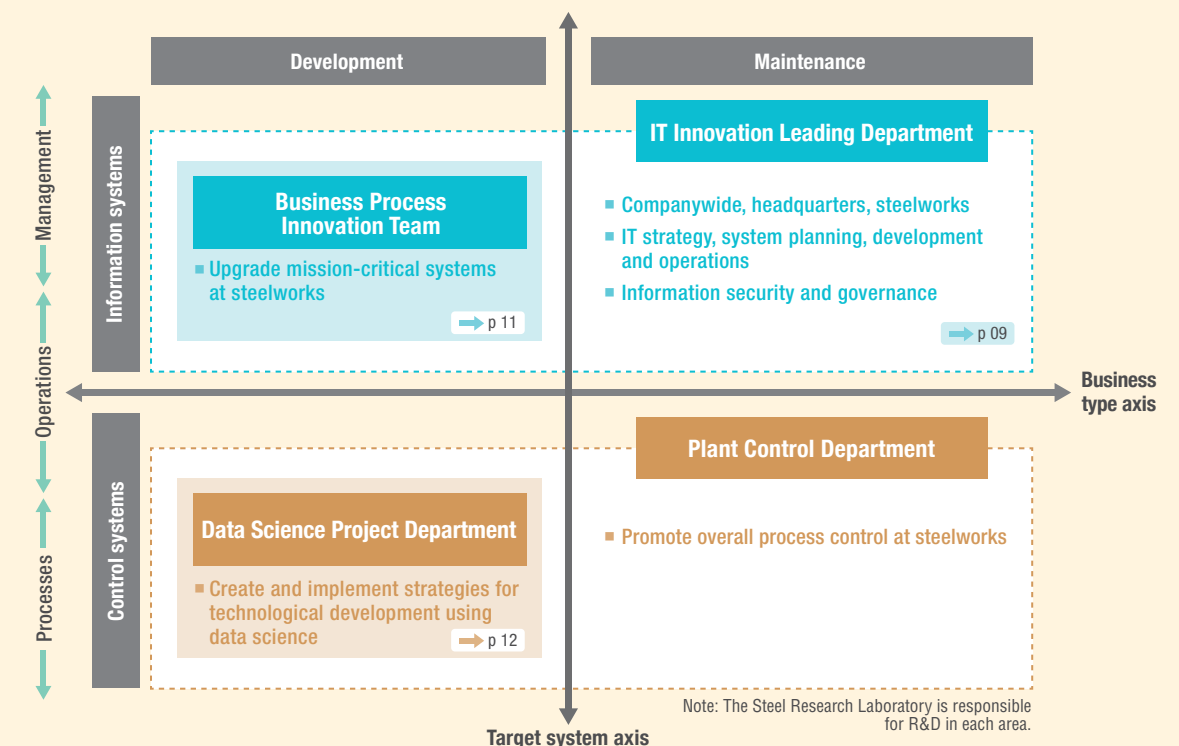
Business Process Innovation Team

Upgrading legacy systems is a management issue that we are making every effort to address. We are using the latest ICT and promoting data science and other forms of sophistication of data use to steadily reform our operations and build flexible systems that can adapt to operational changes. This is a huge project, the likes of which have not been seen before.

Akira Nitta
Vice President



System Division Structure



Data Science Project Department

We take a companywide perspective in efforts to systematically and efficiently apply IoT technologies, AI, and data science mainly for equipment, processes, and operations. We have begun by strengthening our data-collection platform for all kinds of processes, and are working to raise quality assurance and quality control levels through data usage consistent across multiple processes, while also using data seamlessly throughout the company to boost operating efficiency and cut costs.

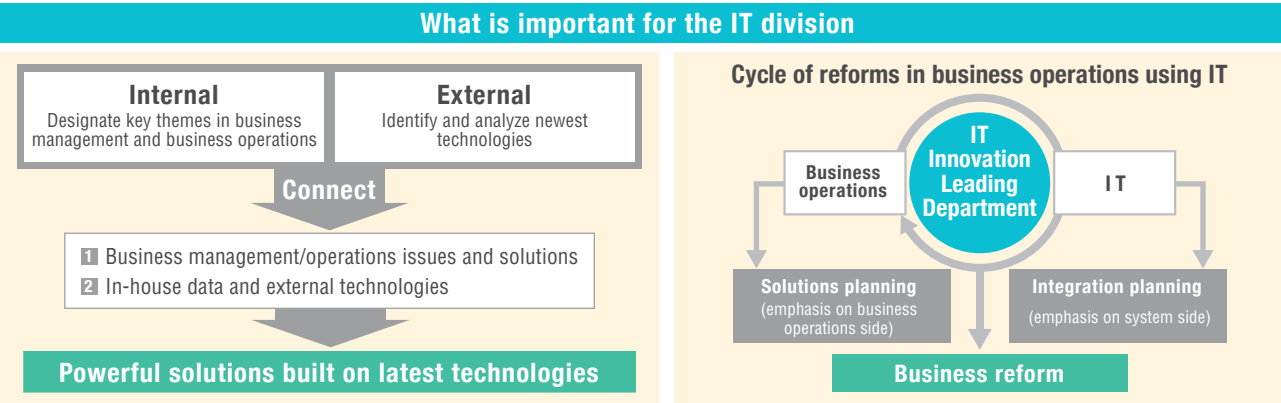
Akira Kazama Vice President



IT Innovation Leading Department

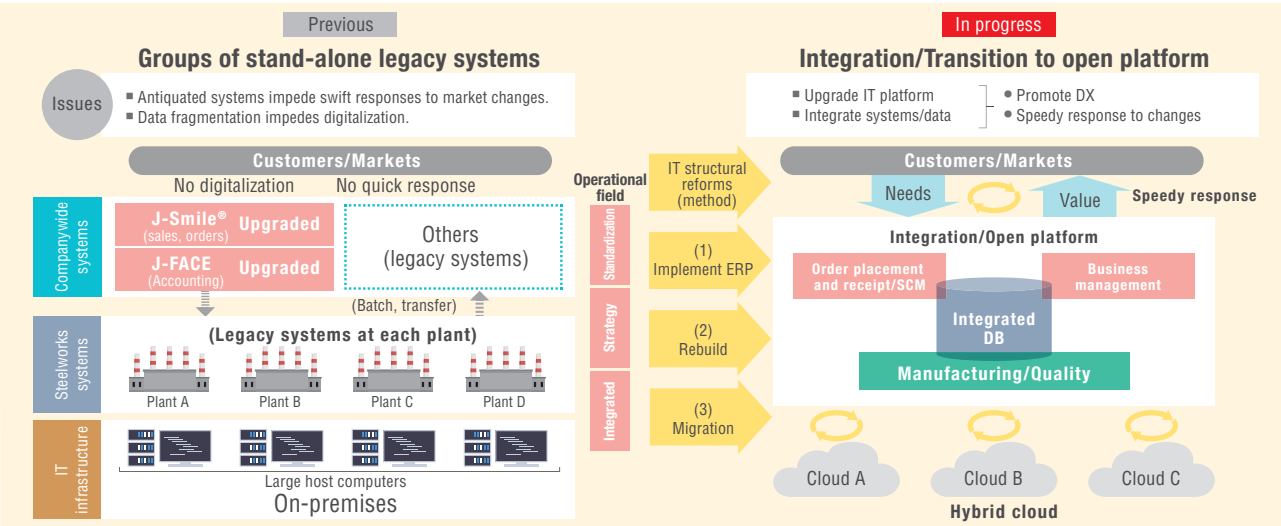
The IT Innovation Leading Department's mission is to encourage reforms in business operations using the latest technologies, see that changes are implemented and then track the results in terms of IT optimization, particularly for infrastructure and security. What is important for us right now as an IT division is to work as a team, with each business division designating key themes in management and business operations. Together, we implement solutions that tie in the latest research in ICT and possible applications. Significant projects require coordination with the basic IT strategies of our IT Steering Committee and have the management team sign off on the plan before solutions are implemented.

We encourage reforms in business operations using IT, see that changes are implemented and then track the results in terms of IT optimization. (IT Innovation Leading Department's mission)



JFE Steel's Companywide (Corporate) IT Strategy

We are upgrading legacy systems and promoting DX (digital transformation), while also building and transforming our IT platform into one that can respond swiftly to external changes.



Promoting DX by reforming IT structure that can respond flexibly to external changes!

JFE Voice!



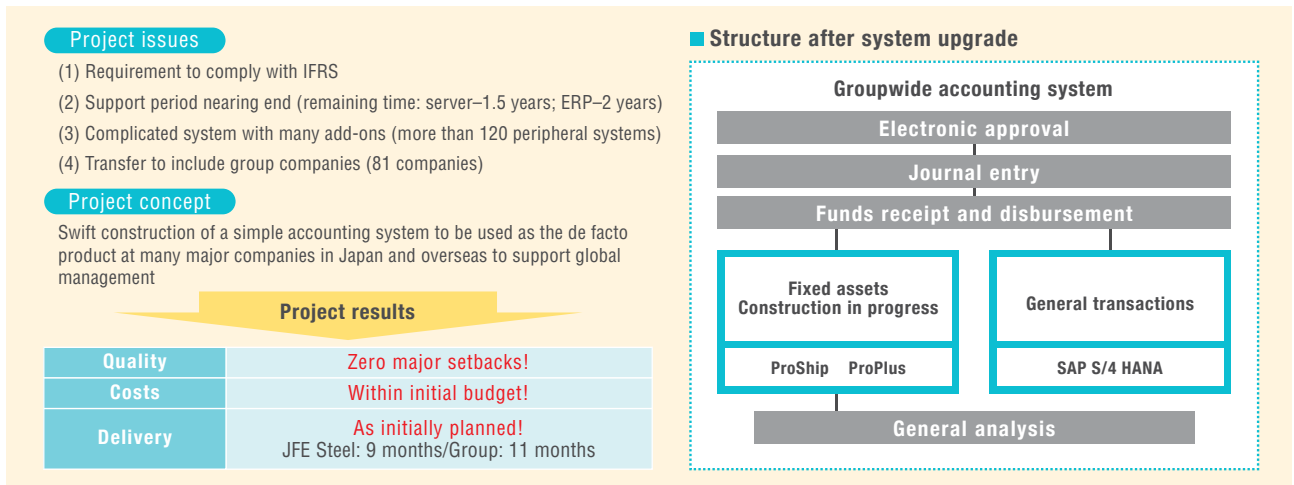
I have been involved in IT infrastructure planning and management and recently been working on reforming head office systems such as the J-Smile® system for sales and orders. We are migrating to open platforms while maintaining to the greatest extent possible the quality of systems that operated on host computers. At the same time, we are working to link peripheral systems, increase operational efficiency and implement measures to recover from disasters. As our work has a broad scope, there are many challenging aspects. Therefore, we cooperate with team members in a variety of positions inside and outside the company, to accelerate our response to external changes and promote DX.

Kenichi Kobayashi, IT Innovation Leading Department

Innovating and standardizing operations by upgrading groupwide accounting system

By introducing the world's latest ERP, upgrading mission-critical systems and pursuing business reform 81 companies including JFE Holdings and JFE Steel are standardizing accounting operations

Recognizing the need to review its IT backbone to support business development in Japan and overseas, comply with International Financial Reporting Standards (IFRS) and make operations smoother and more efficient, the JFE Group upgraded the mission-critical J-FACE system in February 2018. Under a strict policy of building new operations and systems that make maximum use of products' special features, the system was introduced at JFE Steel and JFE Holdings over nine months, and we were able to complete the rollout at 79 group companies in the short time of 11 months. The groupwide accounting system reduced the number of servers used by 75% and achieved a reduction in running costs. This project was highly recognized outside the company as well, receiving awards at the SAP Innovation Awards 2018 and the Japan Institute of Information Technology's Special IT Award (System Integration Prize).



Results of system upgrade

| | | |
|---------------------|------------------------------|------|
| 1 Development costs | vs. development from scratch | -63% |
| 2 Development time | vs. development from scratch | -66% |
| 3 Number of servers | vs. previous | -75% |
| 4 Running costs | vs. previous | -17% |
| 5 Number of ledgers | vs. previous | -55% |

Zero problems in fiscal 2018 year-end settlements

Operations that previously differed at each plant or group company were standardized, making handovers smoother when staff are transferred.

External recognitions/External cases

| | |
|---|--|
| 2018 IT award | IT Award "System Integration Prize" |
| SAP Innovation Awards 2018 | Awarded "Regional Choice" as example of best innovation leadership in Asia-Pacific region |
| Article in Gartner report | Reported as successful example in "Postmodern ERP Project: Tips for Successful Project Completion" |
| Discussions on project with outside companies | Many companies including major electric power, insurance and electronic controls companies held meetings to discuss the project. |

Project team worked as one to upgrade the mission-critical accounting system in a short time!

JFE Voice!



More than 10 years have passed since the introduction of the J-FACE, groupwide accounting system, and this was a major change of the mission-critical accounting system that users had become very familiar with. We were, therefore, faced with the issues of sufficiently explaining the purpose and reasons for the upgrade and training users in the use of the new system, within a short period of time, and almost everyone involved in the project participated in these activities. Going forward, we hope that J-FACE will be helpful in increasing convenience for users and innovating operations.

Minako Nakai, Accounting Department



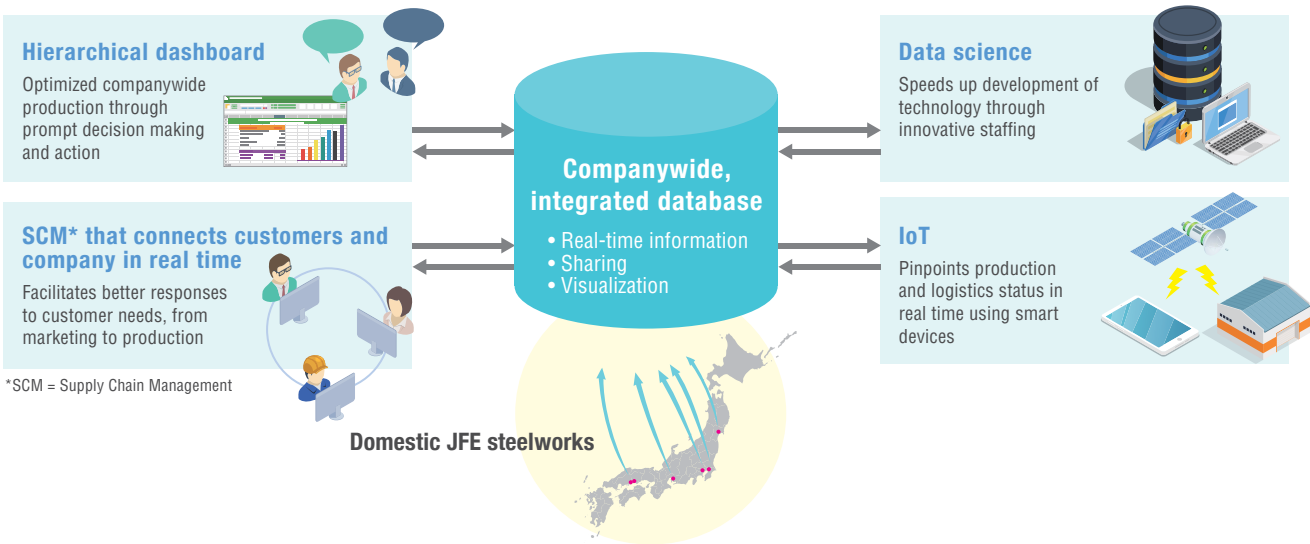
Business Process Innovation Team

Reform mission-critical systems at steelworks using the latest ICT
Create new value through reforms in business operations

We are reforming mission-critical systems at steelworks under the following policy: (1) Rebuilt a system platform using the latest ICT; (2) Redefine operational processes to pass on manufacturing expertise and introduce standardized operations; and (3) Create an integrated database with a standardized data structure.

Through this system upgrade, we aim to create an operating platform that shares and uses all companies' data with all employees, and to transform work styles to create new value.

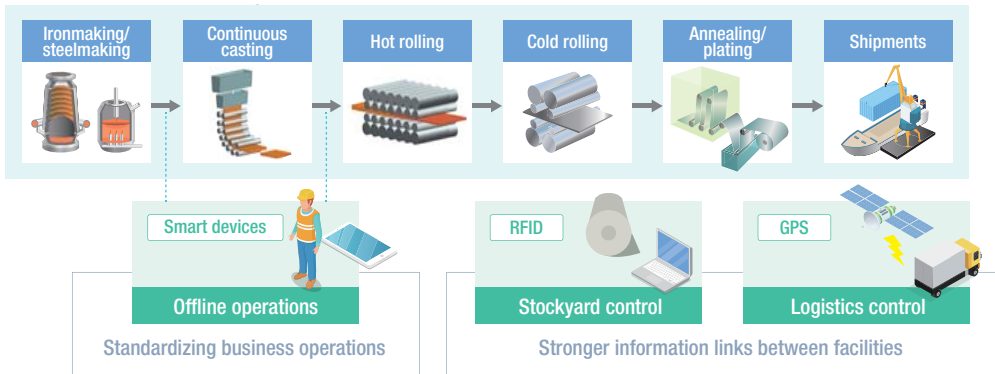
New work styles realized through system upgrades



Enhanced production control

JFE Steel fell behind in its systemization of offline operations but has been working to reverse the situation and realize standardization, and also link the movement of objects and equipment at manufacturing sites in real time using advanced IoT options.

The companywide integrated database pulls together all this information for the formulation of ideal overall production targets and the realization of integrated production control beyond the domestic network of steelworks.



Contributing to the construction of a system platform for the future



Since joining the company, we have been responsible for manufacturing thick steel plates. Now, we are working on the project to reform the mission-critical system for thick steel plates, with responsibility for designing the screens for operation-use terminals and supporting the development of related functions. Along with reforming a system that is easier to understand and easier to use, we are contributing to the construction of a system platform that can enhance operations and make them more efficient in the future.

Kenta Taguchi, Tatsuo Inomata, Daisuke Enoki, Business Process Innovation Team

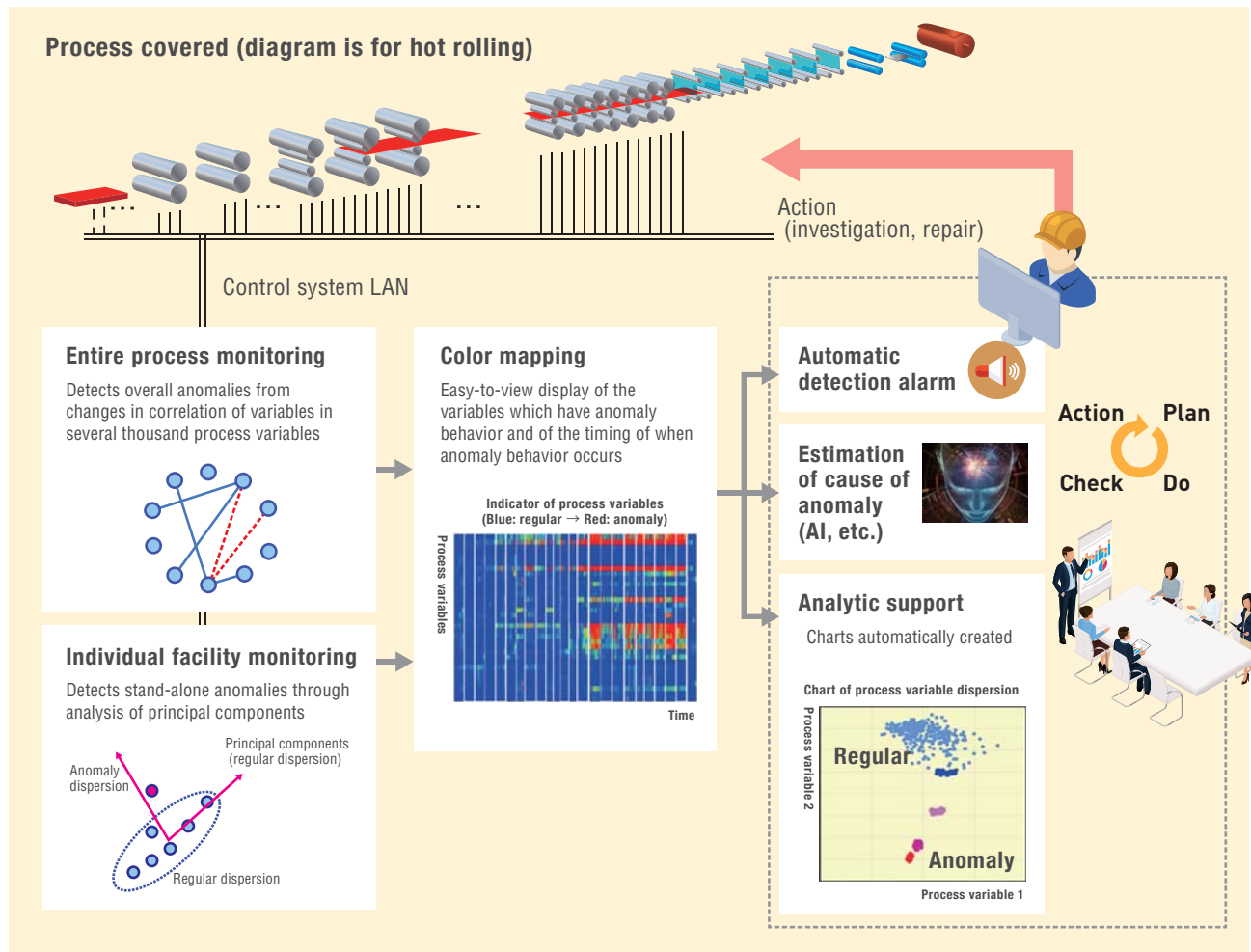


Data Science Project Department

Using data science to detect even small, difficult-to-identify anomalies
Achieving stable operations in steelworks processes!

It is important to maintain sound and stable operations in all steel manufacturing processes, which encompass many upstream and downstream processes. We have developed a framework to warn maintenance operators to detect even small, unanticipated, difficult-to-identify anomalies by using advanced statistical analysis, and are working to introduce this in all processes.

Automated monitoring for anomalies in both the level of the entire process and individual facilities in manufacturing processes



DS technology deepening technologies used at worksites



I am currently developing technologies to diagnose equipment anomalies using big data analysis technologies.

As we implement the concept of preventive maintenance, we are developing proprietary systems that automatically detect anomalies and announce methods for addressing and possible causes of the anomaly, to accelerate the on-site response.

Tatsuhiko Sue, Hot Rolling Technology Section, Hot Rolling Department, West Japan Works (Kurashiki)

02 Engineering Business

Advanced Engineering with ICT—Creating and “*Ni-na-u*”* the Foundation for Life Powered by Manufacturing and Service Capabilities

* “*Ni-na-u*” is a Japanese word meaning supporting and remaining responsible.

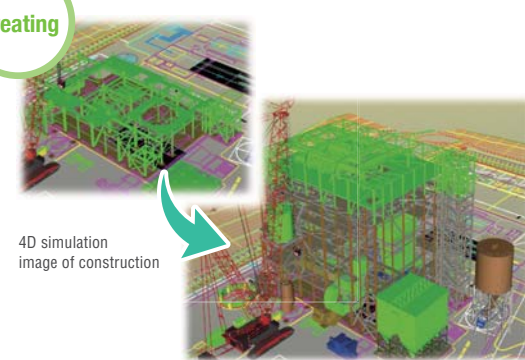
Atsushi Okamoto Senior Managing Director

Our mission is to provide solutions to social issues through planning, designing, building and operating infrastructure supporting people's life and industries. We have a wide range of businesses such as waste-to-energy plant, water treatment plant, renewable energy power generation plant and bridges. As privatization of public services is requested, we are actively expanding “*Ni-na-u*” business in addition to creating social infrastructure. Advanced technologies such as IoT, big data analysis and artificial intelligence (AI) are key drivers for creating and “*Ni-na-u*” the foundation for life. We make the best use of such advanced technologies for state-of-the-art infrastructure business.

Creating the Foundation for Life

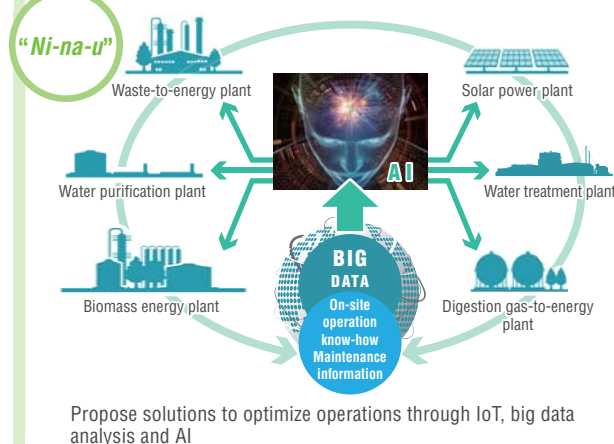
“*Ni-na-u*” the Foundation for Life

Creating



EPC: Actively utilize ICT in fields of engineering, procurement and construction

“*Ni-na-u*”



Propose solutions to optimize operations through IoT, big data analysis and AI

Two platforms supporting “*Creating*” and “*Ni-na-u*”

Global Remote Center (GRC)



Pla'cello data analysis platform



Pla'cello
= Plant + Cervello
Italian for “brains”



Pla'cello®

Data analysis platform that does not require specialized IT knowledge

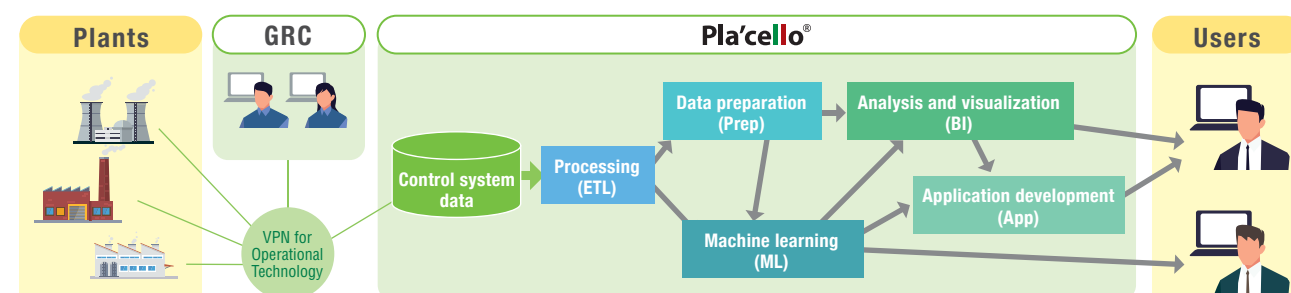
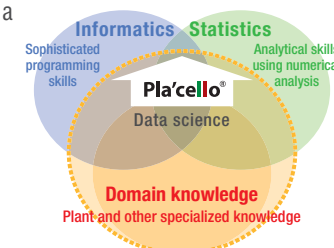


The Global Remote Center (GRC), which opened in March 2018, collects customers' plant operation data and provides services including remote plant monitoring, operational support and maintenance.

The Pla'cello data analysis platform, which allows analysis of a plant's photo and time-series data, was built and started operating in November 2018.

In general, the use of AI and big data is said to require knowledge of informatics, statistics and domain knowledge in a particular field.

The Pla'cello makes it possible to analyze data to detect signs of abnormalities and predict demand without advanced knowledge in informatics or statistics. This permits a reduction of the amount of time required for data analysis by up to 90%. Using Pla'cello, we plan to increase the number of internal engineers engaged in data analysis to 300 by the end of fiscal 2020.



Use of Pla'cello® is spreading

■ Full automation of a waste-to-energy plant

Because the operational status of a waste-to-energy plant changes minute by minute depending on the waste being used as fuel, an operator needs to intervene manually several dozen times each day for stable operations. Using AI image recognition of the state of combustion and systemizing the intervention operations of a skilled operator, we have succeeded in Japan's first full automation of a plant so that no manual intervention is required.



Before automation (manned)
Operators are constantly monitoring and engage in manual operations as needed.



After automation (unmanned)
In place of operators, AI determines the necessity of intervention.

■ Automation of bolt installation inspection in bridge construction

On-site bridge construction uses many bolts, and the inspection of their installation is conducted visually. Using AI image diagnosis, incorrect installation of bolts, including having washers backwards, can be detected with a high degree of precision. Inspections can be carried out in roughly 1/10 the time previously required.

Is this the washer's front or back? Can you tell?



Proper installation

Washer is backwards
Improper installation

Promoting familiarity with data analysis and application development

JFE Engineering holds “ideathon” and “hackathon” events using Pla'cello. These events incorporate agile development with a sense of speed and mutual voting to raise participants' awareness. Through these events, participants can experience idea creation and application development and learn basic AI skills.



Participant's voice

My idea was to measure happiness by smiles to create a brighter company overall. I was amazed that by using AI to measure happiness, in just one day, we were able to create an application that measures the degree of a smile from a smartphone photograph. I'm sure that if everyone in the company becomes familiar with the easy-to-use development environment, significant operational reforms can be achieved.

Koji Yoshii
Manufacturing Process Section, Tsu Works, Infrastructure Engineering Sector

JFE Voice!

03 Trading Business

Using advanced IT to promote global strategies and strive to create new value

Tatsuya Sakamoto Vice President

As the JFE Group's core trading company, JFE Shoji Trade is responsible for an integrated supply chain from raw materials procurement to processing and logistics, in response to customers' diverse needs. In addition, by responding to the confidence and expectations of customers through its business, the company aims to grow together with customers and make its presence felt. JFE Shoji Trade's IT Vision has been formulated for the pursuit of these initiatives, with activities being carried out focusing on four core themes. Using advanced IT, the company is building frameworks that effectively support marketing activities and various administrative operations, creating a structure that makes it easy for employees to do their jobs and to focus on more strategical and sophisticated operations.

JFE Shoji Trade's Vision

Build a stable profit base and expand profitability of trading and operating activities

Shift to marketing strategy operations

Strengthen on-site capabilities

Demonstrate group synergies

JFE Shoji Trade's IT Vision

Themes in advanced IT to support growth

Improve office productivity

Use RPA and AI to automate and elevate business operations (Shift to operations directly linked to marketing strategy)

Boost coil center productivity

Use IoT technology to integrate sensor data (Various improvements through visualization of operating status)

Demonstrate IT-related group synergies

Strengthen connections with JFE Holdings and JFE Steel (including SCM, shared security platform and joint procurement)

Enhance efficiency of consolidated management

Expand applications and upgrade standard systems
Enhance domestic and international communication environment

Platform to Support Advanced IT

Enhanced information security

Stable systems operations

Retain and train IT staff



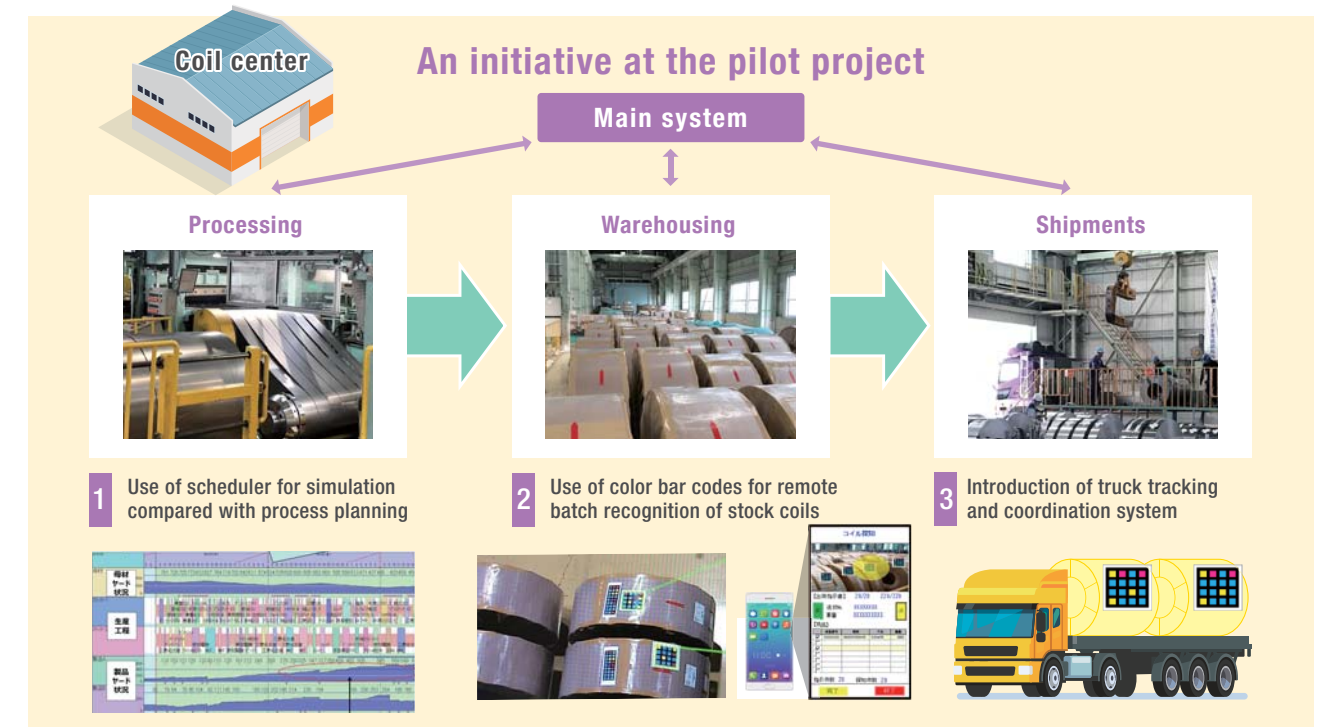
Information technology such as sensors and image processing is making amazing advances day by day.

JFE Shoji Trade is making an approach for the Group steel processing centers to incorporate advanced IT to achieve major increases in productivity with a view of 10 years into the future ("smart factories").

This is not simply a matter of using new technologies; it involves analyzing the situation and issues at coil centers from a third-party perspective and considering the use of new technologies to resolve the companies' issues. The key point is to have employees at work sites become interested in new technologies.

As a pilot project at JFE Shoji Electrical Steel's Nagoya Works, we have been looking into the most effective use of warehouse yards with limited space when production increases are planned, and have confirmed three ways in which IT can be used effectively to resolve this issue (1 to 3 in the diagram below).

Going forward, we will consider effective applications for IT to resolve issues, taking into account each coil center's particular characteristics and situation.



High expectations for support machines at processing centers!

JFE Voice!



Processing centers are expected to process steel materials in accordance with the customer's specifications, ensure that they have the correct size, shape and outward appearance, and deliver products that meet the customer's specifications by the designated time.

As customers' requests become increasingly more complex, cost competitiveness cannot be strengthened through human resource development and technological enhancement alone, and we have high expectations for strong (machine) assistants to support optimal operations at processing centers.

JFE Shoji Electrical Steel Co., Ltd.
Left: Toyohiko Fujisawa, Factory Manager, Nagoya Works; Center: Masami Kouda, Shipping Clerk, Administrative Group;
Right: Yuji Kondou, Process Clerk, Administrative Group

Partners supporting and growing with the JFE Group

JFE Systems, Inc.

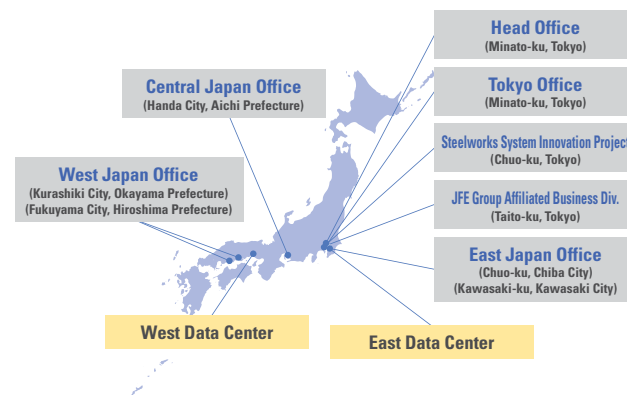
We have been forged by the history of steel.
We support various operational areas as the JFE Group's systems integrator.

Our company was created from the spinoff of the functions of the Information Systems Department of JFE Steel Corporation. The history of JFE Steel's growth is the history of our technological innovation. We continue to build systems with continuity to accommodate changes in the future.

Locations close to JFE Group workplaces

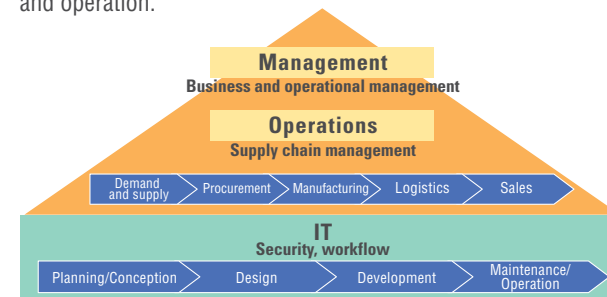
We have offices at JFE Steel's business locations, and support the JFE Group with a total staff of approximately 1,500 employees and partners.

Our systems offer a high degree of reliability, operating 24 hours a day, 365 days a year, for advanced, detailed manufacturing using cutting-edge technologies.



Capabilities in various operational areas and processes

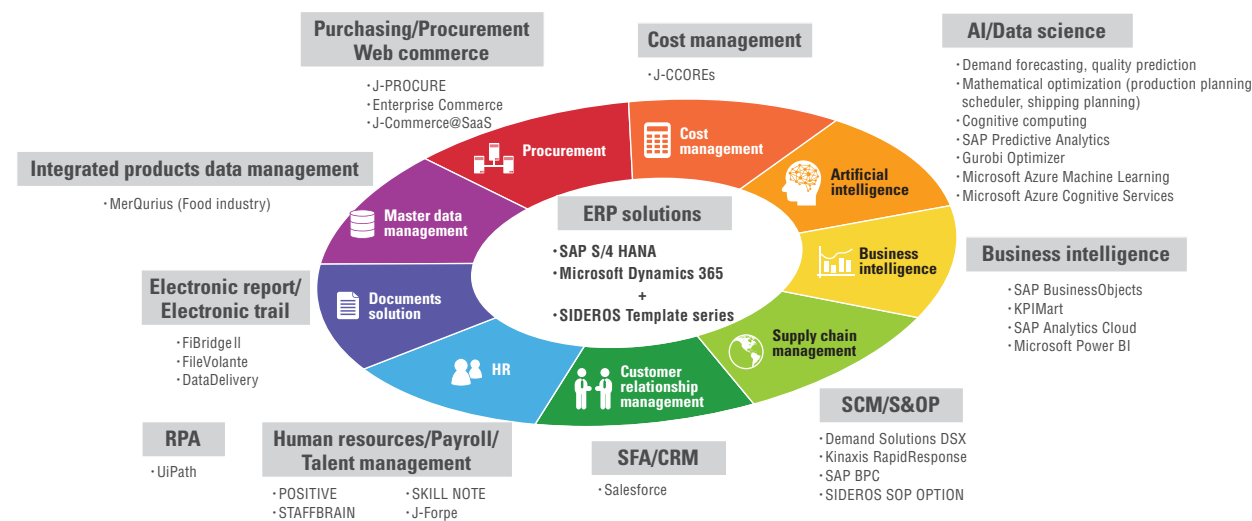
Our systems have supported the steel industry for many years. We have capabilities in many fields: business management, human resources, accounting, planning, procurement, manufacturing management, quality management, logistics, and sales. In addition, as the JFE Group's information systems company, we are responsible for many processes from system planning and conception to design, development, maintenance, and operation.



Solutions backed by experience

We have been providing various solutions outside the JFE Group by using our know-how of manufacturing foundations which we gained by building steelmaking systems. Our solutions are expanding from SIDEROS as our integrated total solutions brand of ERP and related applications to the latest technological fields including mathematical optimization, demand forecasting, AI, and RPA.

Also, we use our experience and technologies acquired through business with non-JFE customers as we continue to contribute to the JFE Group's sophisticated utilization of IT.



EXA CORPORATION

Along with providing data center operations and various solutions, we are accelerating initiatives related to digital transformation (DX).

EXA is an information systems company that was established in 1987 from the spinoff of the systems divisions of the former NKK Co., Ltd. (The name is derived from the decimal unit exa (10¹⁸), which at the time was the largest named unit and represents the pursuit of major dreams and new fields.)

Since receiving a capital injection from IBM Japan Ltd. in 2000, we have been developing an IT business that integrates the JFE Group's user-oriented expertise and IBM's cutting-edge information technology.



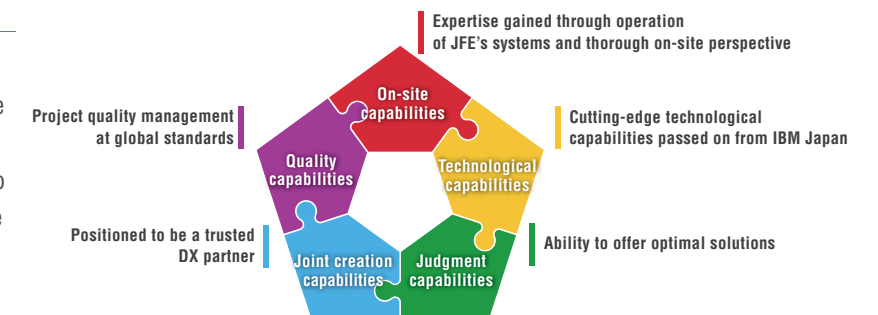
Corporate Philosophy

EXA contributes to society's development with cutting-edge information technology and business innovation.

EXA's strengths

We emphasize our five capabilities developed through years of experience, covering a diverse range of fields from platform construction and operation to the use of advanced technology, to support customers' businesses in a wide range of industries.*

* Industries covered
 Finance, settlement, public services, manufacturing, materials, energy, engineering/marine, distribution, telecommunications/media

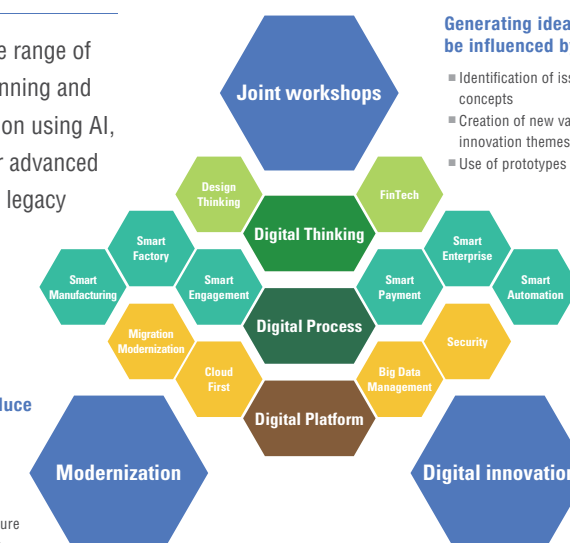


EXA's DX

We support the JFE Group in a wide range of areas, from joint workshops on planning and conceptualization to digital innovation using AI, the IoT, big data analysis, and other advanced technologies, and modernization of legacy systems.

Legacy system realignment to reduce operating load and increase business flexibility and agility

- Upgrade system for standardization, automation, and intelligent enhancement
- Shift to and operation of multi-cloud structure
- Platform construction for digital innovation



Generating ideas for true innovation that cannot be influenced by in words

- Identification of issues that need to be resolved based on design concepts
- Creation of new value and new businesses, consideration of innovation themes
- Use of prototypes to confirm implementation concept

Using the latest technologies to enhance business competitiveness and create innovation

- Use of AI/IoT/blockchains, etc.
- Use of implementation experience acquired as a member of the JFE Group
- Initiatives in cutting-edge technologies in cooperation with IBM

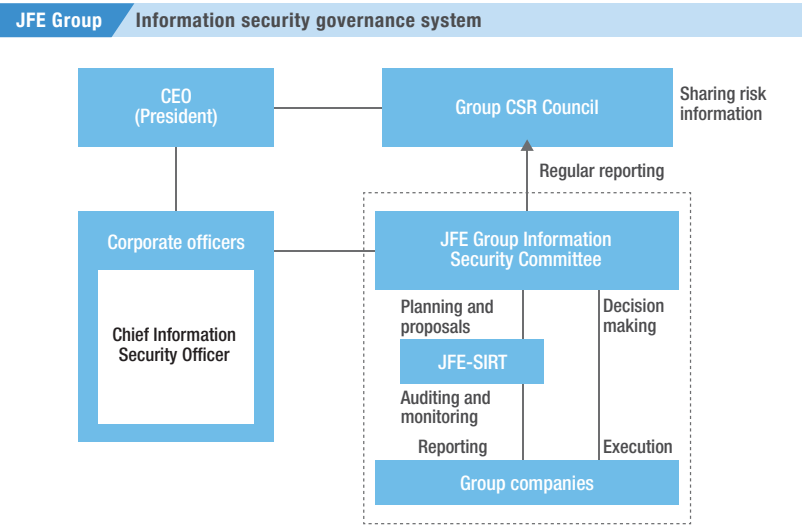
Information Security Management

To prevent cyberattacks and unauthorized use of systems and thus confidently engage in business activities, the JFE Group is constantly working to improve its level of information security management through the following measures.

1 Establish information security governance system

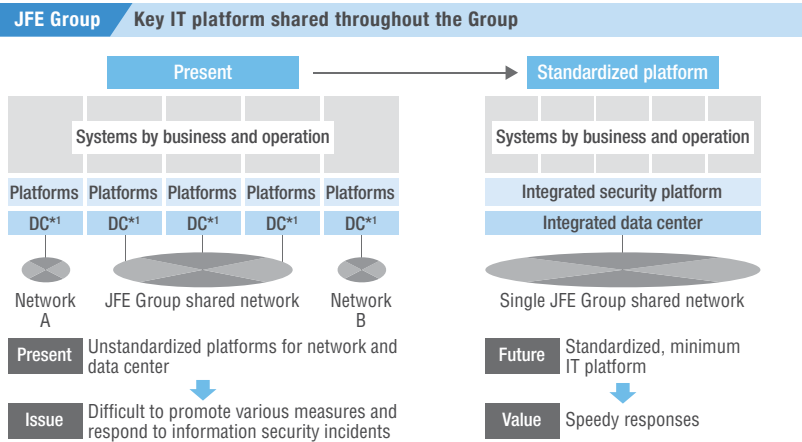
JFE Holdings established the JFE Group Information Security Committee as a substructure of the Group CSR Council. The committee is guided by the JFE Group Chief Information Security Officer at JFE Holdings and has the participation of officers responsible for IT divisions at each operating company. They discuss key issues related to IT, with an emphasis on information security, and determine the direction that the Group will take in that regard.

Based on the decisions made by this committee, the JFE-Security Integration and Response Team (JFE-SIRT), which has the participation of IT division managers from all operating companies, establishes rules and regulations, drafts and promotes the implementation of IT measures, performs information security audits and training, and offers guidance on responding to information security incidents. JFE-SIRT ensures the Group maintains a PDCA cycle for continuous improvements in information security.



2 Key IT measures shared throughout the Group

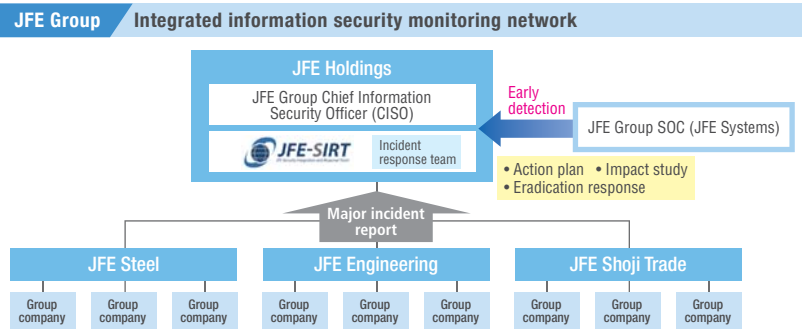
JFE-SIRT and Group companies work together, as a cohesive unit, promoting a common information security platform comprising such components as networks, IT equipment and security-related software, to achieve the same level of information security initiatives throughout the Group and facilitate an immediate response just in case an information security incident arises. Also, efforts are directed toward consolidating procurement and reducing costs.



3 Establish information security incident response structure

JFE Holdings lays out the key points for responding when an information security incident occurs and, through JFE-SIRT, led by the JFE Group Chief Information Security Officer, the Company maintains a structure to ensure quick reporting, action and recovery should a situation occur and measures to prevent the situation from happening again.

To minimize damage caused by information security incidents, the Company has placed an integrated security monitoring net over the entire Group and is building a structure that enables the shared SOC² to detect emerging incidents at an early stage.



Tabletop drills for JFE Group security staff

To raise proficiency in responding to a cyberattack if one were to occur, JFE-SIRT regularly holds cyberattack response drills in cooperation with three operating companies and an information systems subsidiary.

Based on key points for responding to an envisioned outbreak of an incident, participants confirm their respective roles and how they would cooperate with other persons involved, and discuss problems to deepen their understanding. Proposals for improvement arising from these drills are reflected in JFE-SIRT's daily activities.

From this fiscal year, tabletop drills are being carried out for information security staff at Group companies, to roll out SIRT's response expertise to Group companies.

Workshops are held to explain recent targeted cyberattacks and have group discussions in response to questions set in accordance with common cyberattack scenarios. These discussions review the situation at the company and consider response methods and preparations needed, from outbreak to resolution, providing an opportunity for these employees to recognize and take into account these issues in their daily work.

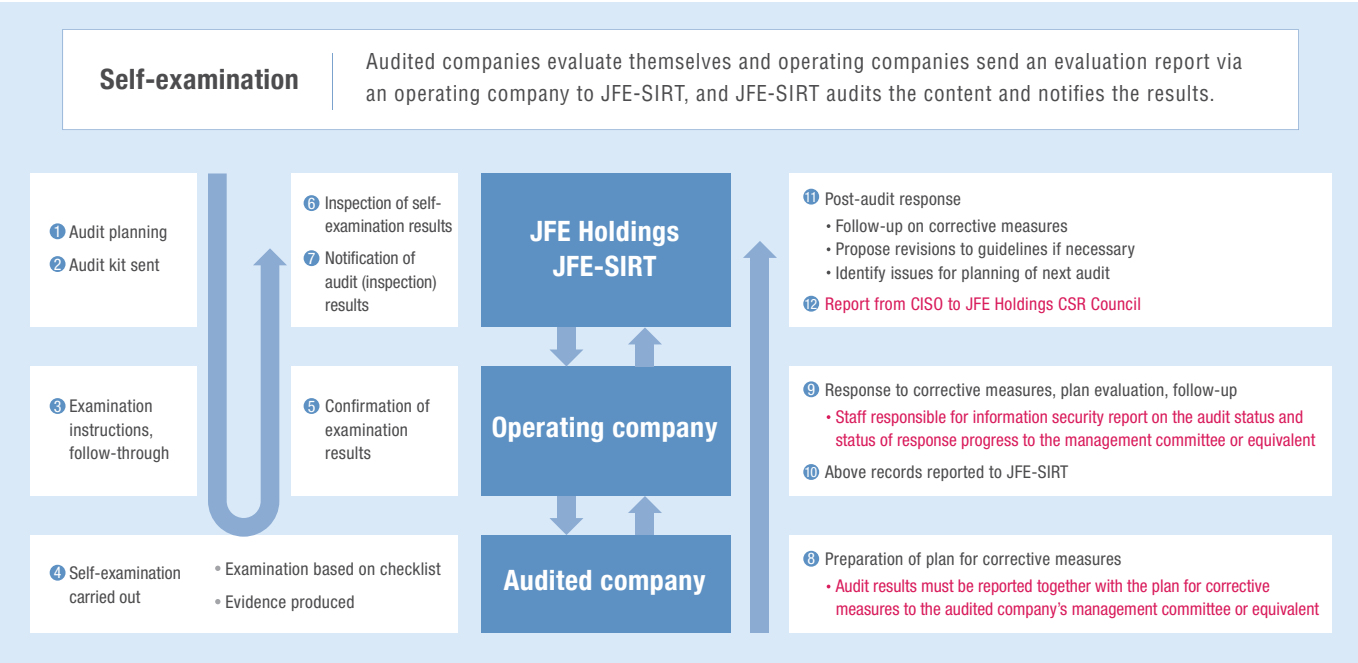


Group information security audit

During 2017–2018, JFE-SIRT carried out information security audits at approximately 260 JFE Group companies in Japan and overseas, to identify and respond to issues quickly, based on the common global information security policy. Notification of audit results and guidance for planning corrective measures lead to a higher level of information security across the entire Group, including an awareness of the importance and training in information security measures.

A second round of audits is also being carried out from the current fiscal year to raise the level of security even higher. These second audits confirm the progress being made in preparing logs and introducing common measures that are required in the event a security incident were to occur, to strengthen security measures at the Group overall.

Group Company Audit Policy





JFE-SIRT

Cybersecurity preparedness is an issue for individuals and organizations, as well as a collective issue for society and national governments.

In addition to being a management issue for individual companies, today this also needs to be viewed as an issue for entire supply chains.

The JFE Group plays a role in society and supply chains as a manufacturer of materials, energy, and infrastructure that supports industry and people's daily lives, and as a company involved in distribution.

To fulfil this social responsibility, the entire Group will continue to strengthen its initiatives in Japan and overseas, in accordance with the meaning and guidelines for action included in the JFE Group Declaration of Cybersecurity Management formulated last year.



Ken Sakata
Team Leader, JFE-SIRT

Formulating the Declaration of Cybersecurity Management

The JFE Group* formulated its Declaration of Cybersecurity Management, based on the declaration by Keidanren, the Japanese Business Federation, in March 2018.

The JFE Group acknowledges the importance of cybersecurity measures. In formulating our management strategy, we recognize the risk of cyberattack as a key management priority. We have drafted appropriate management strategies to counteract this threat. Also, we assign high-level professionals to cybersecurity management, hinging on JFE-SIRT. We take a variety of measures drawing on intelligence and advanced technologies gathered through links to external specialists, and also direct concerted efforts into human resources development from a medium- to long-term perspective.

Under this declaration, for fighting further serious and sophisticated cyberthreats, we are more greatly reinforcing management-led cybersecurity measures

* Group companies subject to this declaration:
JFE Holdings, Inc., JFE Steel Corporation, JFE Engineering Corporation, JFE Shoji Trade Corporation and all Group companies of the three operating companies.

JFE Group Declaration of Cybersecurity Management

1 Recognize cybersecurity as a management issue

The JFE Group recognizes cyber-related risk as a key management priority. We shall enhance our own understanding of the latest cybersecurity developments and actively engage in management by positioning cybersecurity spending as an investment.

Management shall enhance their cybersecurity measures with responsibility while confronting realities, addressing risks, and exercising leadership. Members of management shall chair cybersecurity-related committees at JFE Holdings and its three operating companies, promote constructive discussions, validate various measures and allocate appropriate resources to whatever measures deemed necessary.

2 Determine management policies and declare intentions

The JFE Group shall determine management policies and draft a business continuity plan (BCP) aimed at quick recovery in the event of a cybersecurity incident, emphasizing not only identification and defense, but also detection, response and recovery.

Every year, the JFE Group shall lay out a cybersecurity action plan for the Group, reflecting a review of risk identification, defense mechanisms and guidelines for responding to an information security incident. Also, the JFE Group shall strengthen incident response capabilities through regular drills and prepare the BCP. Furthermore, the JFE Group shall periodically conduct cybersecurity audits on JFE Group companies. Through these efforts, the JFE Group aims to steadily raise the level of the overall Group.

Management shall take the lead in declaring companies' intentions to internal and external stakeholders, and make every effort to voluntarily disclose recognized risks and measures to deal with them, in corporate reporting.

3 Build internal and external systems and implement security measures

The JFE Group shall establish internal systems mainly through JFE-SIRT, ensure sufficient resources including budgets and personnel, and take necessary human, technical, and physical measures.

Using various internal and external human resources development programs, the JFE Group shall cultivate the skills of high-level, professional staff with detailed knowledge of cybersecurity and shall work with external specialists to leverage the benefits of sharing know-how. The JFE Group shall strive to educate and motivate employees at every level in all divisions at each company under the JFE Group umbrella through in-house training and drills, as well as participation in cross-industry exercises.

The JFE Group shall manage cybersecurity throughout domestic and international supply chains by monitoring security measures at outsourcing contractors and others on the supply chain.

4 Encourage widespread use of cybersafe products, systems and services

The JFE Group shall manage cybersecurity across the full spectrum of corporate activity, including development, design, production, and supply of products, systems, and services.

5 Help build safe and secure ecosystems

The JFE Group shall collaborate with relevant government agencies, organizations, industry associations, and other bodies to actively share information, engage in dialogue, and build human networks, both in Japan and internationally. The JFE Group shall contribute to reinforcement of cybersecurity throughout global society by raising awareness of measures taken on the basis of such information.



JFE

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