

REVITALIZING JAPAN

~The JFE Group's Initiatives~

As Japan looks to the 2020 Summer Olympics in Tokyo, its economy is becoming increasingly robust, breaking away from the longstanding anchor of deflation. Also, the country has moved well down the recovery track it started following the Great East Japan Earthquake. In this special feature, we introduce JFE Group initiatives that are supporting the revitalization of Japan in line with key themes: restoring and strengthening the nation; pursuing environment- and energy-related businesses; and passing on our technological traditions.



Installation of jacket-type quays with arc-shaped retaining wall at Sendai-Shiogama Port (February 2013)

Special Feature 1

Restoring and Strengthening the Nation: Reconstructing Japan's Infrastructure

Development and reinforcement of port quay walls: a collaborative initiative undertaken by JFE Steel Corporation and JFE Engineering Corporation

Protecting port facilities across Japan by installing highly earthquake-resistant, jacket-type quays with arc-shaped retaining walls

Loading wharfs consisting of conventional jacket-type quays comprise two structures: a quay supported by columns set into the seabed and an earth retaining wall supported by raked piling built in a reclaimed shoreline. Usually, these structures are completely separate; however, aiming to improve earthquake resistance, JFE Engineering has developed a new jacket-type quay construction method* employing quays and arc-shaped retaining walls that are structurally integrated. JFE Steel's role in the development project** was examining the earthquake resistance technologies applicable to retaining walls, while JFE Engineering carried out technical reviews of designs for connections between the jacket and retaining wall.

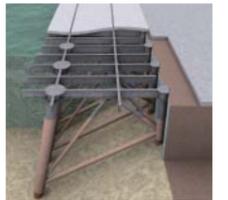
The benefits of the new method include a significant reduction in the weight of steel needed for the retaining wall and the elimination of the need for raked piling to support it. These benefits translate into a 20% reduction in total construction costs as well as an approximately 10% shorter construction period. Recognizing the advantages of this

technological breakthrough, the Tohoku Regional Development Bureau of Japan's Ministry of Land, Infrastructure and Transport (MLIT) adopted this highly economical and time-saving construction method for the reconstruction of Miyagi Prefecture's Sendai-Shiogama Port.

Looking ahead, we will employ this new construction method as part of our continuing commitment to contribute to the reconstruction efforts that have been instituted since the Great East Japan Earthquake, as well as the improvement of international ports designated by the government as strategically important.

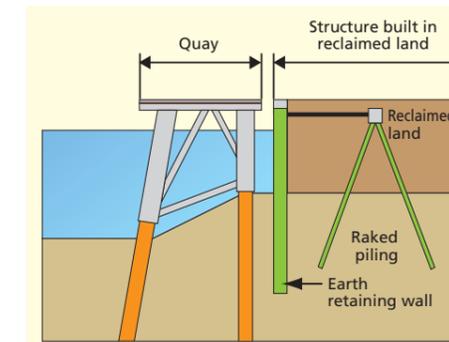
* This method is registered with the New Technology Information System (NETIS) database maintained by the Ministry for Land Infrastructure and Transport (MLIT).

** The Port and Airport Research Institute also participated in the joint R&D project.



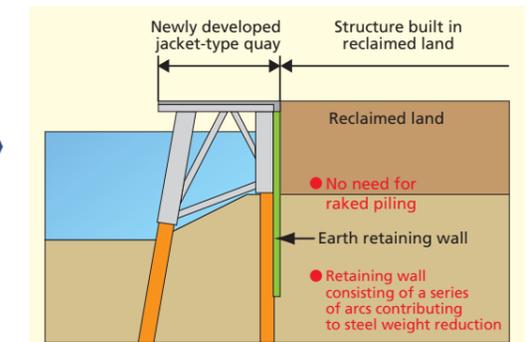
Conventional jacket-type quay construction

The quay and the structure built in the reclaimed land are separate



New construction method

Jacket-type quay is structurally integrated with the arcs of the retaining wall built in the reclaimed land



"Ganba" L-shape Jacket Structure. Innovative Solution for Solidifying Sheet Pile Quay Walls

In Japan, a number of aging sheet pile quay walls are in need of reinforcement and improvements in their earthquake resistance. Conventional reinforcement methods, however, are costly and time consuming because of the need for ground improvement in the reclaimed land and to solidify the seabed to ensure sufficient strength to support the quay.

To counter these difficulties, JFE Engineering and JFE Steel have developed and patented* a reinforcement technology they have dubbed the "Ganba" L-shape jacket structure. This method, while leaving the location of existing quay wall lines unchanged, secures greater wall strength by setting up an L-shaped reinforcement structure that rests on the seabed. The reinforcement structure's components are built of steel pipe piles and prefabricated L-shaped block components composed of steel shells and concrete. The use of these

prefabricated components can reduce workload at the construction site, cutting the construction period in half compared with conventional methods. Moreover, by eliminating the need for costly ground improvement work, the total construction cost is around 70% of the cost of most conventional methods. Thus, the method provides a solution for a number of problems that previously beset this type of reinforcement work.

Looking ahead, we will promote the "Ganba" L-shape jacket structure as a solution for addressing growing needs for the reinforcement and earthquake-resistance improvement of sheet pile quay walls.

* TOA CORPORATION also participated in the joint development and became a patent co-owner.

Special Features

Special Feature 2

Pursuing Environment- and Energy-Related Businesses as Japan's Eco-Friendly Forerunner

Accelerating Urban Development and Building Construction with HBL[®]440, a High-Performance Steel Made Using Cutting-Edge Thermo-Mechanical Control Process

Recent years have seen the emergence of many redevelopment projects centered in greater metropolitan areas, with a number of skyscrapers, including ultra-high-rise office buildings and housing complexes, being constructed. To accommodate the need for high-strength steel materials for the columns used in such construction projects, SA440, a 590N/mm² class high-performance steel for building structure materials, has been widely adopted. However, to achieve both high strength and toughness, the steel must undergo multiple rounds of heat treatment through separate lines, resulting in a long turnaround between the receipt of order and delivery.

Looking for a better solution, JFE Steel employed its cutting-edge thermo-mechanical control process to develop HBL[®]440 in May 2012. Having expanded the range of products made of this new 590N/mm² class high-performance steel, as of August 2013, JFE Steel's HBL[®]440 manufacturing lines have been capable of producing steel plates with thicknesses of up to 100mm.

With the aim of omitting multiple heat treatment in the course of HBL[®]440 production, JFE Steel utilizes Super-OLAC[®]* cooling equipment that embodies its market-leading "Number One" technologies. As a result, the turnaround for HBL[®]440 delivery has been shortened to approximately one month less than that for

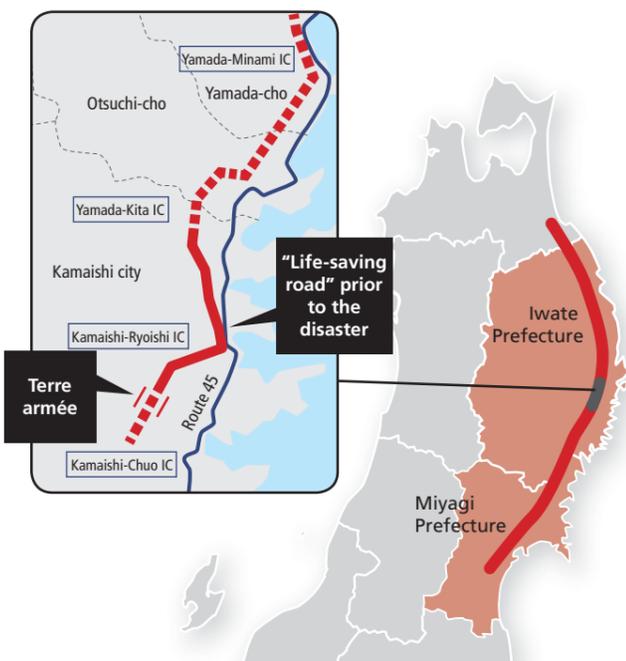
conventional steel materials, significantly improving construction times for high-rise buildings.

Going forward, we will develop high-value-added products for use in architecture and construction materials to accommodate wide-ranging customer needs.

* On-Line Accelerated Cooling equipment is capable of performing quick cooling with superior accuracy.



Terre Armée Construction Method: Maintaining a "Life-Saving Road"



The Kamaishi-Yamada Road,* a road constructed to alleviate traffic jams on Route 45, which connects Kamaishi city and Yamada-cho, was dubbed a "life-saving road" right after the Great East Japan Earthquake hit the region. Prior to the disaster, some had speculated that the road was unnecessary. Once the earthquake struck, however, the road came into its own, serving

as an evacuation route for local children and preventing the isolation of rural areas by providing access to evacuation shelters. Today, the Kamaishi-Yamada Road is seen as indispensable by the residents it serves.

Employing its terre armée construction method for reinforced soil walls to create highly safe and earthquake-resistant roads, the JFE Shoji Trade Group will continue to maintain this "life-saving road" and other road-related infrastructure, thereby contributing the reconstruction of the disaster-stricken areas.

* The Kamaishi-Yamada Road today constitutes a 23km stretch of the Sanriku Coastal Highway, which has been nicknamed "The Road of Reconstruction," extending a total length of 359km. Construction details: Maximum wall height: 19.48m; wall length: 318.13m; wall dimension; 4,331.9m²

HIPER[®], an Earthquake-Resistant Line Pipe That Reinforces Energy Infrastructure

HIPER[®]** is an earthquake-resistant line pipe developed by JFE Steel. The pipe is highly deformable and thus it is able to resist buckling even if the movement of the ground strata distorts the line. As the first company to commercialize this innovative type of pipeline pipe, JFE Steel created it by bringing together its cutting-edge material design technologies and a proprietary manufacturing process using HOP[®]** online heating equipment at the plate mill in the Fukuyama District of the West Japan Works. At the same time, JFE Steel utilized its newly developed Super-OLAC[®]-A accelerated cooling equipment launched 2011 at the facility, thereby achieving greater material uniformity for mass-produced products.

HIPER[®] performs particularly well in harsh environments. For example, the product is best suited for installation in earthquake-prone areas or discontinuous permafrost

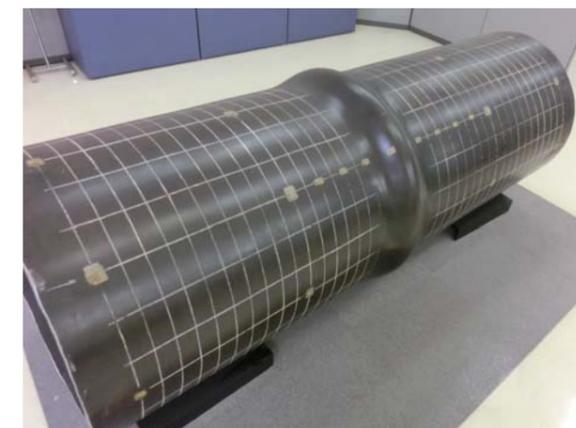
zones, in which the freezing and thawing of soil causes frequent uplifts and subsidence in the ground strata. Today, HIPER[®] is used throughout the world for pipelines in areas prone to ground movements, helping maintain the safety of energy transportation networks.

Looking ahead, we will remain a forerunner of technological innovation while satisfying customer needs by developing and delivering highly functional steel material products with superior quality. In these ways, we will contribute to resource and energy development around the globe.

* Higher Performance for Earthquake Related Ground Movements
** Heat-treatment On-line Process: Equipment for the heat treatment of steel plates using induction heating. HOP[®] represents one of JFE Steel's unique "Only One" technologies.



Pipeline construction (Western Canada)



HIPER[®] earthquake-resistant line pipe

Epoch-Making HIPER[®] Wins Prizes All around the World

HIPER[®] earthquake-resistant line pipe is becoming increasingly sought after worldwide, garnering favorable customer reviews for its superior performance. Reflecting this, HIPER[®] developer JFE Steel has been highly commended for its technological achievements and has been awarded a number of prizes around the world.

In November 2013, HIPER[®] was recognized at the 2013 R&D 100 Awards hosted by R&D Magazine, a U.S.-based technological information magazine. Every year, the R&D 100 Awards selects 100 products released in the previous year that best embody recent technological breakthroughs. This prominent awards event is nicknamed the "Academy Awards of technological innovation."

Moreover, the product won the 60th Okochi Memorial Technology Prize from the Okochi Memorial Foundation in March 2014.

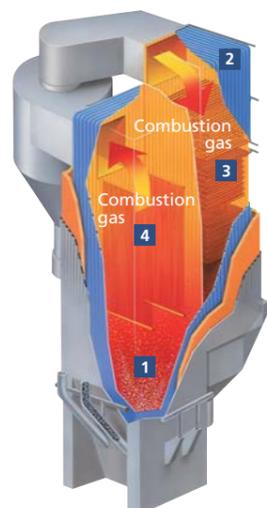


2013 R&D 100 Awards ceremony (Florida, the United States)

Bioenergy

On the back of growing expectations for largely employing biomass fuels and wood waste as a substitute for fossil fuels, the Japanese government's Biomass Nippon Comprehensive Strategy sets out a roadmap for the introduction of domestically produced biomass fuels as well as the establishment of a bioenergy-powered society. The JFE Group is assisting with the realization of this strategy in various ways.

Circulating fluidized bed boiler (CFB)



1 Fluidized bed furnace
Fuel is fluidized by air introduced from the bottom of furnace and burned

2 Water cooling walls
Membrane walls for cooling are set up around the boiler to minimize heat loss

3 Superheater
The superheater is optimally designed for conditions of combustion gas and steam

4 Wing panels
Wing panels (evaporator or superheater components) with high durability are installed in the furnace

Multiple Orders Received for Biomass Power Plant Construction

In concert with the introduction of the feed-in tariff (FIT) scheme introduced under the Renewable Electric Energy Act in July 2012, a number of power plant construction projects now under way will truly launch the renewable energy generation business. JFE Engineering is playing a key role in the design and construction of solar photovoltaic, geothermal and wind power generation facilities all across the nation. These projects include the development of biomass power plants, which employ a circulating fluidized bed boiler (CFB) fed by domestic wood chips as well as palm kernel shells (PKSs) imported from Southeast Asia.

Among a number of orders JFE Engineering has received for biomass power plant design and construction was one from SHOWA SHELL SEKIYU K.K. in August 2013. In accordance with this order, JFE Engineering will establish a new plant in Kawasaki city. The plant will boast a maximum output of 49MW, making it Japan's largest biomass facility in terms of power generation capacity.



Strengthening Our Biomass Fuel Supply Structure

To facilitate the launch of biomass power plants, it is crucial that operators secure stable supplies of biomass fuels. PKS, or palm kernel shell, is imported mainly from Southeast Asia and expected to become a mainstay biomass fuel. JFE Shoji Trade has further strengthened the PKS supply structure that it has built through an import channel from Malaysia to Japan, with the aim of contributing to the popularization of biomass power generation. Following the introduction of the FIT scheme, a number of Japanese business operators entered the biomass power generation business and annual domestic demand for PKS is likely to reach approximately 1 million tons in 2016.

Employing cargo vessels used for steel product exports on their return trips, JFE Shoji Trade will ship PKS mainly to domestic customers. Also, plans call for increasing the

annual shipment volume from the current 20,000 tons to 200,000 tons by 2017. To secure a stable PKS supply, JFE Shoji Trade will make full use of its strategic advantages, such as direct supply contracts with excellent palm oil mills that produce PKS with hardly any foreign matter and an import channel that uses Lahad Datu Port, a Malaysian port that is one of that country's closest to Japan and boasts relatively low traffic.



To accommodate increasingly robust PKS demand, JFE Engineering and JFE Shoji Trade will collaboratively assist biomass power generation operators, drawing on their respective competencies in the fields of plant engineering and biomass fuel supply. By doing so, we will contribute to the popularization of biomass power generation.

Special Feature 3

Passing on our Technological Properties; Maintaining Japan's Manufacturing Heritage

Technical Experts Pass on Steel Manufacturing Skills to the Next Generation

Today, the majority of Japan's manufacturers are confronting a rapid change in age distribution in the workforce due to the mass retirement of baby boomers. In step with this, passing on technological skills to younger operators is becoming an increasingly urgent issue. JFE Steel, too, has been seeing a decline in veteran employees at steel manufacturing sites. While staffers who joined the workforce following the merger of JFE Steel account for approximately 40% of all employees, a growing number of veterans will soon reach retirement age. Accordingly, there is a pressing need for passing on steel manufacturing skills to younger employees.

JFE Steel has been promoting proactive initiatives aimed at passing on its technological traditions to young and mid-level employees. For example, we have developed a unique human resource nurturing system that makes every employee's skills level visible, which allows us to provide educational programs optimized to each employee's strengths and weaknesses.

Despite these initiatives, imparting skills and know-how for troubleshooting and other irregular tasks has been a crucial issue for us, because the conventional educational programs used to date have not been suited to enhancing such competencies.

To address this situation, in October 2013 JFE Steel launched a new initiative, appointing technical experts dedicated to nurturing human resources and assigning them to every business unit in its East Japan and West



Japan works as well as the Chita Works. Specifically, veteran employees and reemployed retirees are assigned to particular manufacturing lines to serve as dedicated trainers, thereby sharing their immense wealth of knowledge and know-how about steel manufacturing. They will also spearhead troubleshooting drills while preparing educational materials. At present, 100 technical experts are on the job and we will expand the scope of this initiative to cover other worksites in need of their help.

In addition to regular technological education programs centered on day-to-day operations, we will promote this initiative across the board, thereby ensuring that steel manufacturing traditions established by our predecessors will be passed on to the next generation of engineers who will, in turn, lead the JFE Group's future operations.

"Win&WeDGE" Training Center for Welding Nurtures Leading Engineers

In March 2013, the Heavy Industry Works of JFE Engineering's Tsurumi Works established "Win&WeDGE,"* a training center for learning welding skills, with the aim of speeding up the process of passing down technological properties. While providing young engineers with day-to-day training programs, the center offers them the opportunity to engage in dynamic dialogues with highly skilled veterans. Looking ahead, we will work hard to nurture the competitive engineers needed to lead Japan's manufacturing sector into the future.

* Welding Innovation & Welder's Dojo for Global Equipment



Training session at a welding practice booth

Disseminating Japan's Wealth of Manufacturing Know-how to Bases Worldwide

JFE Shoji Trade boasts a network of steel processing centers consisting of 16 bases around the world. Although each center hires local employees, some of the newcomers have not seen steel being produced until they join. To impart the know-how required at manufacturing sites, the JFE Shoji Trade Group dispatches Japanese engineers from other steel processing centers. Taking up residence worldwide wherever their presence is most needed, these engineers strive to share the wealth of manufacturing traditions we have accumulated in Japan to local employees, help to launch new steel processing centers, oversee facility operations and ensure safety and quality management.



Japanese and Thai operators sharing manufacturing know-how at SASC, a steel processing center that specializes in automobile steel sheets