Japan takes on the infrastructure challenges of the 21st century

Greener, stronger, and more resilient to natural disasters, when it comes to infrastructure, Japanese companies have gained considerable expertise in maintenance and repair, disaster prevention and carbon-reducing technologies, and are ready to take their know-how globally to countries facing similar issues as Japan.

From a Shinkansen railway system boasting zero passenger fatalities in 50 years of operation to the world’s longest suspension bridge connecting Awaji Island to Kobe, Japan is recognized as a global leader in construction and infrastructure. Since the country’s first construction boom prior to hosting the 1964 Olympics, Nippon enterprises have been admired not only for their ability to build engineering marvels, but for their capacity to do so in one of the world’s most inhospitable environments, marked by tectonic activity and mountainous regions. It is therefore no surprise to find that since 1990, the ‘land of the rising sun’ has consistently ranked amongst the Top 5 in the WEF’s ‘quality of infrastructure’ assessment.

Today, the Japanese construction market has matured. With the oldest population in the world, Japan’s demographic line has been sharply declining since 2011, which has lowered the amount of new projects. The Japanese market is currently sustained by the rising need for maintenance and repair of aging infrastructure, which also includes leveraging the latest disaster prevention technologies to enhance resilience to natural disasters. And with Japan looking to reach carbon neutrality by 2050, the environment is also a major priority for those in construction and related industries.

“One aspect is that the market is definitely faced with aging infrastructure and facilities, and how to deal with that issue. The second aspect is the strengthening of buildings towards mitigating earthquake damage, and the third aspect is preventing disasters apart from earthquakes, such as the flooding of rivers. Creating infrastructure to be resilient in the face of these three aspects is the primary aim of projects nowadays, and there is a high demand for projects in this field,” says Takesuke Nakano, President of Mitsui Consultants.

“As for technologies that we can provide in order to prevent and reduce disasters, we are focused on the conservation of coasts, river channels, and groundwater tables in order to mitigate the effects of events such as tsunamis, floods and landslides. One specific technology developed by our company is called RRI (Rainfall-Runoff-Inundation), a flood prediction system using a flood analysis model developed by ICHARM (The International Center for Water Hazard and Risk Management). We have developed a real-time flood prediction system for floods all over Japan using a supercomputer.”

Indeed, Japanese companies like Mitsui Consultants have gained considerable expertise and knowledge when it comes to disaster prevention technologies and are ready to share those technologies with other countries facing increasing natural disasters due to climate change. Chuo Kaihatsu has also developed state-of-the-art technology to mitigate the impact of landslides, with its Kantaro early warning system (EWS) utilized globally.

“In recent years, many preventive conservation projects are needed, such as flood improvement in watersheds, prevention of landslides and other measures due to the frequent occurrence of torrential rain due to climate change,” says Makoto Tanaka, President of Chuo Kaihatsu. “Especially in the past decade, there have been many natural disasters that have resulted in the loss of precious lives and valuable property. Situations like this make us reflect, and I want to utilize the technology we have accumulated here at Chuo Kaihatsu and deliver that internationally. We also have various maintenance and management technologies that we have accumulated over the past 76 years. We wish to contribute overseas by putting together a set consisting of our infrastructure and our technology.”

Yasuhiro Tochimoto, President & CEO of Kawasaki Geological Engineering (KGE), highlights that the Sagso Tunnel collapse in the Yamachi Prefecture in 2012 triggered a shift in emphasis from new construction to maintenance and management of aging civil engineering structures. “As a result, the number of surveys, inspections, diagnostics and designs for maintenance and management has increased compared to civil geological surveys of new construction projects, and the renewable energy field has also become active. Therefore, the content of our business has diversified,” he explains.

“The aging of civil engineering structures is inevitable, but the policy has shifted from corrective maintenance, in which repairs are conducted after the infrastructure is damaged, to preventive maintenance, in which measures are taken to extend the life span of the infrastructure before it breaks down. In preventive maintenance, it is important to accurately assess the topographical and geological conditions at the time of construction and maintenance management.”

Even ATOX – a company principally engaged in the maintenance, management and deactivation of nuclear power plants – has become involved in the maintenance of public infrastructure, leveraging its know-how in Kray technology to develop non-destructive inspection systems for large-scale structures. “It’s a unique technology that we obtained over the years in the nuclear field. By using X-ray technology, we can visualize the inside of concrete that is over one-meter thick, and this visualization technology should contribute greatly to maintaining the integrity of bridges in the future,” explains ATOX president Toshikazu Yaguchi.

“This technology is used to conduct a demonstration project for integrity verification of prestressed concrete bridges for expressways. Like human beings, social infrastructures need to be maintained for their health and longevity. Our technology will be needed not only in the field of nuclear energy, but also in the fields of people and social infrastructures, and I hope this infrastructure-related technology will spread around the world in the future.”

One of Japan’s largest expressway operators, the East Nippon Expressway Company (E-NEXCO) is engaged in maintenance and management of expressways. With the shift towards electronic and autonomous vehicles, president Toru Obata says the company is “sincerely looking toward the future”, where E-NEXCO will play a vital role as the number and nature of expressways continue to advance around the globe. “In the last 10 years, we diversified our activities and began conducting maintenance and renovation projects. Rather than overseeing new construction projects, we have developed leading technologies to update and enhance the performance of existing expressways,” says Mr. Obata, who also points to the important role the company can play in reducing carbon emissions.

“The first way to reduce carbon missions is to ensure that our highways are in great condition. This includes managing construction and conducting highway redevelopment so that the maintenance is up to date. With regard to highway redevelopment, increasing the number of lanes to four, for example, reduces congestion and directly leads to reducing CO2 emissions. To support the switch to electric cars and renewable energy, we will increase the number of EV (electric vehicle) chargers in parking and service areas. Utilizing our R&D capabilities, we want to develop a technology that enables EVs to charge while driving. We are currently working towards testing this technology.”

With the Japanese government’s plan for Japan to reach carbon neutrality by 2050, the role of power generation and related equipment companies will indeed be vital, while institutions such as the New Energy
and Industrial Technology Development Organization (NEDO) and the Mitsubishi Research Institute (MRI) will provide support to companies looking to reduce their carbon footprints. The leaders of both organizations point out the importance of close collaboration between the public and private sectors regarding to the 2050 goal.

“In line with Japan’s policy of realizing carbon neutrality by 2050, NEDO has received significant funding to implement the Green Innovation Funding Program. Under this program, concrete goals shared by the public and private sectors for realizing carbon neutrality have been established,” says Ishizuka Hiroaki, Chairman of NEDO.

“At this time (February 2022), 11 projects have been launched under this program. These projects focus on areas for promising growth identified in Japan’s Green Growth Strategy, such as the creation of large-scale hydrogen supply chains, development of advanced aircraft and shipping technologies, and development of advanced solar cells.”

Giving his take on the 2050 target, MRI president Kenji Yabuta says: “For example, in reaching carbon neutrality, optimizing human resources to improve the economy and energy is the challenge. Both the public and private sectors will need to work together.”

“Our role in the issue of carbon neutrality would be on putting emphasis on solar, wind and renewable energy, and reducing coal-generated power. To create this shift, it is very important for us to work closely with the public sector,” adds Mr. Yabuta.

“Building a number of solar, wind and other renewable energy power plants falls under the private sector. We can contribute by creating solid networks between the private and the public sectors, which will allow us to help make policies with the public sector and make sure the private sector can implement these projects to completion. The experience and knowledge we have gained through our work in the public sector enables us to effectively provide consulting services to the public sector.”

Mitsubishi Heavy Industries Environmental and Chemical Engineering (MHIEC) operates several waste-to-energy (WtE) facilities in Japan and Singapore, incorporating the technology of its parent company, Mitsubishi Heavy Industries. With the push towards carbon neutrality, the company is working to develop carbon capture and other technologies in a bid to boost the green credentials of its WtE plants.

“We focus on increasing power generation from waste. Efficient power generation requires high-temperatures and high-pressure boilers. It is not easy because waste energy’s crude gas is more hazardous and the boiler tube melts and erodes at higher temperatures. We are developing technologies to solve this challenge,” explains MHIEC president and CEO Takayuki Hishinuma.

“We are pursuing higher temperature and pressure to achieve higher efficiency of power generation. Our technology is called an exhaust gas re-circulation system. All exhaust gas has low oxygen content and we can reduce harmful nitrogen oxides. Flue gas can also be recycled and reduced. This is a very important technology.”

MHIEC also has carbon capture technology that it plans to use for CO2 recovery at its Tsuzuki WtE plant in Yokohama. “The captured CO2 will be sent to one of the biggest gas utility companies in Japan, and they will convert the CO2 to methane through methanization,” adds Mr. Hishinuma.

“Also involved in the operation of WtE plants (including biomass) in Japan, TRE HOLDINGS specializes in waste management, metal recycling, renewable energy and environmental engineering. As part of its plan to support the creation of a circular economy, the company aims to support countries in Southeast Asia in their quest to diversify and expand their energy mix.

“Currently we have six power generation plants in Japan, and through these we have been able to accumulate knowledge on power generation. From here onwards, we want to focus mainly on Southeast Asia, where we can utilize our know-how,” says TRE’s chairman and CEO, Matsuoka Naoto.

“It’s not only biomass power generation, but we also utilize solar power generation as well. I believe there are a number of countries in Southeast Asia that are lacking power. Therefore, by creating a presence there, we hope to contribute to the development of those countries.”

Ishizuka Hiroaki, Chairman, New Energy and Industrial Technology Development Organization
MRI: Tackling today’s needs and tomorrow’s challenges

Through its Value Creation Process, Mitsubishi Research Institute (MRI) works alongside public and private actors in designing far-reaching solutions to global challenges.

Of all the theories advanced to account for Japan’s reluctance to embrace digitalization, perhaps the most persuasive is that the country’s analogue systems were so efficient that it had no need to go digital. Covid has changed all that, however, and a concerted effort is now underway to bridge the gap between the physical and digital worlds.

Enter the Mitsubishi Research Institute (MRI), a Japanese think-tank of more than 50 years standing, which, thanks to its innovative business model, finds itself perfectly placed to meet the challenges presented by factors such as the country’s aging population and low birth rate.

According to President Kenji Yabuta, MRI provides two core solutions to these issues: “The first is optimizing human resources to enhance productivity; the second is improving wellbeing through initiatives in the healthcare sector based on our unique value creation process (VCP).”

While maintaining its consulting work in the public sector, which remains at the core of its business, MRI is extending its range of activities to offer the same to the private sector, and to further take on the real-world applications of the solutions it proposes. For example, in the field of digital transformation, Mr. Yabuta describes how MRI helps companies evolve as the “DX journey”. The process of transformation itself is “an adventure”, with MRI lending a hand in both charting the way forward and guiding companies along the way.

A shared spirit of action across the company led to the creation of its Value Creation Process (VCP), a singular model that enables MRI to provide consultation research and policy-making advice, which it can then help implement in the real world. Mr. Yabuta adds: “We launched our VCP Management program to facilitate the efficient flow of this process from upstream to downstream. Our upstream work consists in recommending policies to attain the most ideal solutions. Downstream, we implement solutions ourselves in collaboration with business partners or by supporting other businesses to do so.”

In practice this process serves to create synergies between the public and private sectors, building solid networks which foster collaboration and mutual growth. A striking example of this is in the field of renewable energy, an area of increasing importance as Japan moves towards carbon neutrality. Focusing on electricity-trading specifically, MRI identified a gap in the Japanese market and began working in tandem with Dutch-based KYOS Energy Consulting with the aim of leading the emerging market in Japan.

The partnership shows how research and consultation (upstream) can lead to real-world application (downstream). As Mr. Yabuta states, “MRI forecasts the kind of work that will be required by our society 30 years from now”, harnessing their research to “enhance people’s quality of life”.

Looking to the future and alongside existing opportunities in the energy and healthcare sectors, the company is turning its focus to well-being. “The idea,” Mr. Yabuta says, “is to enable more people to live more active lifestyles.” Accordingly, MRI has created a structure within the local community involving the transportation and infrastructure sectors: the Region Ring service, a regional digital currency geared towards supporting active lifestyles.

Outside of Japan, MRI is also looking to expand its international network, with offices recently established in Hanoi for Southeast Asia and Dubai for the Middle East. The purpose, according to Mr. Yabuta, is two-fold: “to create a network with the governments and Japanese companies in those regions, and to address various societal issues that these regions will face.” Underlying this dual purpose, of course, is the knowledge that having experienced many of these problems itself, Japan is in an excellent position to share its expertise with the rest of the world.

Meanwhile, as evidenced by their recent collaboration with KYOS, MRI is also clear on the importance of European and North American countries in addressing issues such as carbon neutrality and digital transformation. Helping Western start-ups establish their business in Japan and provide their services to the country’s population will, in time, mean the introduction of cutting-edge technologies and new innovations. Most recently, MRI began working in the field of data analytics with OVHcloud, Europe’s largest cloud-service provider, to accelerate digital transformation in APAC markets.

Addressing prospective future partners about the unique opportunity that working with MRI provides, Mr. Yabuta says: “We at Mitsubishi Research Institute address various societal challenges and have advanced technical expertise. We are committed to accelerating and improving the digitalization of Japanese society, and would like to work together with companies that are interested in expanding their businesses in these fields within Japan, Southeast Asia and the Middle East.”
E-NEXCO: A clear vision for the future of transportation infrastructure

One of Japan’s largest expressway operators is developing next-generation monitoring and maintenance technologies for overseas markets.

Boasting nearly seven decades of experience, the East Nippon Expressway Company (E-NEXCO) specializes in the construction, management, and maintenance of expressways in eastern Japan. It currently monitors some 4,000km of roadway.

“We were founded in 1956 as the Japan Highway Corporation,” says President Toru Obata. “In 2005, the company was privatized and E-NEXCO was established. In the first few years, we focused on managing and organizing expressways and overseeing the construction of routes and transportation infrastructure. In the last 10 years, however, we’ve diversified our activities and begun conducting maintenance and renovation projects, developing leading technologies to update and enhance existing expressways.”

In 2019, E-NEXCO’s growing global influence saw it establish an Indian subsidiary, E-NEXCO INDIA (ENI). “ENI is currently bringing E-NEXCO technologies to India, conducting related research, and providing support for Japanese companies entering the Indian market,” Mr. Obata says. Among the technologies introduced in India is the E-NEXCO Eye, a Network Survey Vehicle tasked with detecting and measuring road conditions— including International Roughness Index data (IRI; an index of ride quality), cracks, and rutting. “ENI took E-NEXCO Eye equipment that’s actually used on Japanese expressways and customized it to local specifications together with Indian road operators and others,” Mr. Obata explains.

“The E-NEXCO Eye’s most important feature is that it provides both availability and accuracy. Conventional methods require manual work during the daytime and under traffic restrictions. This leads to various problems, including obstruction of traffic, danger to workers, and prolonged work periods. However, the E-NEXCO Eye can accurately acquire data in just one trip while traveling at a maximum speed of 100km/h. What’s more, it uses lasers that can take measurements at night and is equipped with rotating lights and indicator boards for safety. E-NEXCO Eye’s advantages of speed, safety and precision make it the best measurement method for sustainable mountain road development in India,” Mr. Obata says. “We have also dispatched long-term experts on highway construction, maintenance, and policy support through the Japan International Cooperation Agency (JICA). Moreover, we accept road engineers from developing countries through the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and JICA, and provide them with training in Japan.

“In addition, we work with ASFINAG of Austria, with whom we have a technical cooperation agreement, as well as road-related organizations in various countries to inspect sites and exchange views on on-road technology.”

In FY2021-22, employees of E-NEXCO and its Group companies participated in various international conferences. They included such academic gatherings as an international road conference of the World Road Association (PIARC) in Calgary, a technical seminar organized by the Indian Road Congress (IRC), and the Japan-India Road Exchange Conference. The participants used those opportunities to gather information on the world’s expressway technologies and disseminate information on E-NEXCO Group technologies and know-how overseas.

“Looking at the future, we’re sincerely interested in rolling out such technologies internationally, with a special focus on Southeast Asia,” adds Mr. Obata. “We will continually strive to take our overseas business even further by making maximum use of our expressway technology and know-how.”
Geological surveys to meet the needs of society

Kawasaki Geological Engineering specializes in geological surveys which are critical for offshore resource exploration, civil engineering works, and preventive maintenance of Japan’s aging infrastructure.

Kawasaki Geological Engineering (KGE) has been engaged in marine geophysical surveys since 1970 and built up experience in submarine resource surveys, submarine active fault surveys, and geological surveys related to the construction of submarine tunnels and strait crossing bridges.

"Our company has grown as a geological survey expert and we have developed our technologies to coincide with the needs of society.”

Yasuhiro Tochimoto, President & CEO, Kawasaki Geological Engineering Co., Ltd.

Takeuchi providing the foundation for the next generation of low-cost, short-period and ecological construction

Since 1993, Takeuchi Construction has undertaken approximately 1,600 projects (totalling in excess of 3.8 million square meters), including factories, warehouses and shopping centers throughout Japan.

"Unfortunately, like with any technologies, we can’t prevent disasters completely, so we needed to develop a design method to manage the risks,” says Mr. Takeuchi. “We have introduced FEM analysis, which allows us to simulate with a high degree of accuracy the ground settlements and seismic effects.”

With nearly three decades of experience and a focus on non-residential and commercial facilities, Takeuchi Construction is eyeing overseas growth following success in Vietnam. "The U.S., Iran and some Southeast Asian countries such as Indonesia, are promising locations. Creating franchises with local partners having the technical standards necessary is one approach,” states Mr. Takeuchi.

"Although surveys differ between land and offshore, topography and geology should be evaluated seamlessly. Our greatest strength is our ability to provide advanced solutions, both surveys, and evaluations, for land and ocean.”

Kawasaki Geological Engineering Co., Ltd.
www.kge.co.jp

Takeuchi Construction Inc.
www.takeuchi-const.co.jp/en
The leader in slope-related disaster prevention technology

With the increase in landslides and slope-related disasters due to climate change, Chuo Kaihatsu aims to bring its state-of-the-art disaster mitigation technology to Southeast Asia, South America and beyond.

Averting disaster with digital flood prevention technology

Flooding is an increasing occurrence in many parts of the world, causing untold damage. Mitsui Consultants’ unique System utilizing RRI can forecast major floods and help save millions of lives as a result.

In 2020, floods caused the deaths of more than six thousand people across the globe, the second largest figure recorded in a decade as adverse weather events linked to climate change increased worldwide. Faced with this challenge, one company in Japan – a country which suffers disproportionately from the damage caused by flooding each year – has developed a new flood prediction system that aims to prevent and reduce such disasters.

“We are focused on the conservation of coasts, river channels and groundwater tables in order to mitigate the effects of events such as tsunamis, floods and landslides,” explains Takasuke Nakano, President of Mitsui Consultants. “Our company developed a flood prediction system utilizing RRI (a Rainfall-Runoff-Inundation analysis model developed by ICHARM – The International Center for Water Hazard and Risk Management).”

Chuo Kaihatsu today provides cutting-edge geotechnical analysis and disaster mitigation services, providing geological information through the internet, ground and structure simulation using big data and AI, ground risk assessment using point cloud data from drones, and ground and structure maintenance using sensor technology. “We want to install our Kantaro tilt sensors in various conditions around the world. By doing so we can prevent as many slope disasters as possible,” adds Mr. Tanaka.

Due to climate change, natural disasters are becoming ever-more frequent. From South America to Southeast Asia and beyond, Chuo Kaihatsu will play an important role in keeping societies safe in the face of increasing slope disasters, thanks to long-established technology and expertise in geotechnical analysis that has earned the company its sterling reputation in Japan.

Using a supercomputer, the RRI system forecasts not only river flow rate and water level through integrated and dynamic analysis, but also the inundation area and level. The platform is a one-stop system, made possible by inputting rain data, DEM data, and land-use data, and is enabled for real-time use. While Mitsui Consultants has already developed a system that covers the entirety of Japan, the system is also open-sourced and reprogrammable for use in diverse countries where flooding causation varies in nature.

“This means our RRI system can be used anywhere in the world,” says Mr. Nakano. “It is not yet there, but we are starting to test it on specific geographical areas and create simulation models around them.”

In doing so, Mitsui Consultants eventually aims to provide solutions for global water problems, aligning with the Sendai Framework for Disaster Risk Reduction (SFDRR) and U.N. Global Sustainable Development Goals (SDGs) by utilizing its highly accurate RRI model.

“Ultimately, our goal with this technology is to accelerate the calculation speed and make it possible for people throughout the world to be able to utilize it, and, in doing so, save as many lives as possible from flooding. We are also ready to provide solutions on DX (Digital Transformation) technology to accurately assess things like the gap between buildings or what might become a potential obstacle or obstruction, helping to make construction in these areas more safe, secure, and speedy.”

Contact:
Makoto Tanaka, President, Chuo Kaihatsu Corporation

www.ckcnet.co.jp/global

Mitsui Consultants

www.mccnet.co.jp/en
New merger sets out on sustainable mission

The newly formed TRE HOLDINGS CORPORATION is embarking on a strategy to promote carbon neutrality by taking on the challenge of developing new technologies.

“We will be working together diligently to tackle decarbonization, protect the environment and create a Japan that we will be proud to hand to the next generation.”

Matsuoka Naoto, Chairman and CEO; Abe Mitsuo, President and COO

TRE HOLDINGS CORPORATION merged to form TRE HOLDINGS CORPORATION; a new company that hopes to help solve the problems that impede global sustainability.

“What we at TRE HOLDINGS want to achieve is to fully utilize limited resources and to produce as many solutions as possible to problems for which currently there are not any appropriate answers,” says Matsuoka Naoto, Chairman and CEO of TRE HOLDINGS, a Group of businesses specializing in waste management, metal recycling, renewable energy and environmental engineering.

“The awareness of society as a whole to the environment is now undergoing a dramatic change,” says Abe Mitsuo, President and COO.

In helping make this transition from a linear economy to a circular economy, the executives at TRE HOLDINGS affirm that the recent merger of their two companies is not the goal, but rather the beginning of a journey that will help protect the planet. The Group is open to further partnerships in pursuit of this noble mission.

MHIEC: A leader in waste-to-energy technologies

A company that has supplied hundreds of waste-to-energy facilities in Japan and overseas, MHIEC is embracing digital transformation and a greener future as it looks to expand its global reach.

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Specializing in the design, construction, operation and maintenance of waste-to-energy (WTE) plants, Mitsubishi Heavy Industries Environmental & Chemical Engineering (MHIEC) has delivered over 300 such facilities both in Japan and abroad, supplying more than 20 to China alone since the 1980s.

As Japan’s aging population decreases, MHIEC’s aim is to continue to grow its global presence, says President and CEO Takayuki Hishinuma. “The Japanese market is shrinking, so expanding our business overseas is very important,” he says, pointing to the Middle East as a particular target. “The climate change, depletion of resources and energy, and marine plastic problems have become universal issues in recent decades. With a first-hand sense of these crises, last year TAKEEI CORPORATION and REVER Holdings Corporation merged to form TRE HOLDINGS CORPORATION; a new company that hopes to help solve the problems that impede global sustainability.”

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TRE HOLDINGS CORPORATION merged to form TRE HOLDINGS CORPORATION; a new company that hopes to help solve the problems that impede global sustainability.

“What we at TRE HOLDINGS want to achieve is to fully utilize limited resources and to produce as many solutions as possible to problems for which currently there are not any appropriate answers,” says Matsuoka Naoto, Chairman and CEO of TRE HOLDINGS, a Group of businesses specializing in waste management, metal recycling, renewable energy and environmental engineering.

“The awareness of society as a whole to the environment is now undergoing a dramatic change,” says Abe Mitsuo, President and COO.

In helping make this transition from a linear economy to a circular economy, the executives at TRE HOLDINGS affirm that the recent merger of their two companies is not the goal, but rather the beginning of a journey that will help protect the planet. The Group is open to further partnerships in pursuit of this noble mission.

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SWCC: Providing next-generation social infrastructure

Worldwide, data centers are a critical enabler of the global digital revolution. However, a common challenge for these vital digital hubs is that as processing speeds of servers and network switches evolve, they have to be replaced every few years. For this reason, optical fiber cables are today being installed in massive quantities thanks to their ability to enable optical transmission technology for several generations to come.

“One such product that can help in that respect is our Rollable Ribbon (e-Ribbon®) which enables high-capacity communication and efficient installation,” says Takayo Hasegawa, Chairwoman and CEO of SWCC Showa Holdings Ltd, the Nikkei Asia-listed manufacturer of electrical wires and cables.

Given that optical fibers are critical to telecommunications performance, they must be small in diameter, lightweight, yet as dense as possible. e-Ribbon® meets these demands and is attracting a great deal of attention globally due to its ability to accommodate a large number of fiber-optic installations.

The only Dipforming system in Japan for making MiDIP®

“Deformable and flexible "e-Ribbon®"’”

“Hyperscale data centers with high processing power and enormous storage will be the norm in years to come and like any other business, they will be subject to stiff price competition and thus there will be a need to reduce operating costs,” explains Dr. Hasegawa. “e-Ribbon® allows for more optical fibers to be installed in a fast and efficient manner, all while reducing construction costs.”

Oxygen-free copper MiDIP®

Through its innovative technology and focus on R&D, SWCC is not just well placed to meet the challenges of the global telecommunications industry, but also the great transformation underway in the automotive sector with the transition to electric vehicle (EV) manufacturing. The company’s MiDIP® is an oxygen-free copper wire used in electronic and automotive components.

“In order to meet the needs for miniaturization of motors for EVs at a high level, we pursued technologies to reduce oxygen content as close to zero as possible and to eliminate impurities such as copper oxide powder, resulting in the birth of our brand MiDIP®,” says Dr. Hasegawa. “This oxygen-free copper MiDIP® is made using equipment that is unique to our company and only available in Japan. Believing that the time would surely come when quality oxygen-free copper would be in demand, we introduced GE’s dip-forming system which has evolved significantly over the years. As a result, with the spread of electric vehicles, the demand for oxygen-free copper of high purity with excellent workability in the manufacture of motors to replace engines has increased, and MiDIP® has been able to establish its position in the industry.”

In addition, there are innovations that could contribute to the realization of a decarbonized society by providing cleaner transportation. SWCC has recently developed a tri-axial superconducting cable with NEDO (New Energy and Industrial Technology) and BASF Japan that can reduce power transmission energy loss by more than 95%. As a highly efficient power supply technology that does not cause power loss due to its zero electrical resistance, superconductivity technology has attracted a lot of attention from various fields such as energy, electronics, medicine and transportation.

“The greatest strength of this cable is that the conductor itself has no electrical resistance, so large energy can be carried with minimum energy losses. Our developed tri-axial superconducting cable can greatly contribute to reducing CO2 emissions,” says Dr. Hasegawa.

“Terminal of tri-axial superconducting cable”

“I do believe that as Japan moves towards a carbon-neutral society through the various policies and goals it has set for 2050, we will see more and more policies that enable these types of technologies, and I believe that our superconductivity technology is going to play a big role.”

SWCC Showa Holdings Co., Ltd.

www.swcc.co.jp/eng
Unparalleled technology and human expertise to ensure safe and stable energy

ATOX provides human and technological assets supporting the nuclear power industry and is pioneering medical applications based on its decades-long experience.

Boasting over 60 years of experience, ATOX is a leading Japanese specialist in the maintenance, management and deactivation of nuclear power plants. Notably, the Tokyo-based company brings crucial know-how to the decommissioning and decontamination of the Fukushima Daiichi Nuclear Power Station.

“Our strongest traditional business is decontamination,” says ATOX President Toshikazu Yaguchi. “For obvious reasons, once a decommissioning project happens, decontamination is an essential part of that – and it’s one of our big strengths. That’s why we’re involved in many decommissioning projects across Japan.”

ATOX works with French nuclear company Orano in Fukushima, as part of a joint venture established in 2014. The company’s international collaborations also include a developing partnership with U.K. firm Createc, which provides unique radiation analysis technology. In addition, ATOX is the sole distributor in Japan for telemanipulators manufactured by Central Research Laboratories in the United States, and for power manipulators produced by PaR Systems, also a U.S. enterprise.

“We’re putting a lot of focus into partnerships with overseas companies,” Mr. Yaguchi says. “We want to utilize their technology and experience in Japan.” ATOX has itself also developed state-of-the-art equipment, such as an aerial vehicle and a robot – the latter dubbed “Raccoon” – that are designed for remote decontamination.

Meanwhile, the firm has branched out into nuclear medicine. In an industrial-academic collaboration with Japan’s National Institutes for Quantum Science and Technology, ATOX has co-developed Vrain, the world’s first helmet-type device for positron emission tomography (PET) brain scans. By arranging detectors in a hemispherical shape so they are close to the patients, the machine offers a high-resolution image despite its low number of detectors.

ATOX is also working with RIK-EN, a Japanese scientific research institute, on the development of targeted alpha therapy, and is the exclusive distributor in Japan for the 68Ge/68Ga generator, a device made by the Belgian company IRE ELIT to manufacture radioisotopes for nuclear medicine.

“Our priority is to increase the lineup of products in our nuclear power and medical business areas,” Mr. Yaguchi says. “We’re actively searching for equipment abroad that can be used in Japan.”

"We’re leveraging all available engineering resources to regain the public trust in nuclear energy in Japan.”
Toshikazu Yaguchi, President, ATOX Co., Ltd.
Shikoku Welding Electrode: Fusing innovation with quality

For 75 years, Shikoku Welding Electrode has been providing high-quality welding solutions for large-scale projects. An object is only as strong as its weakest link, and for thousands of years humans have been working to strengthen these links through welding metals together. At an industrial scale, welding is imperative to keep the global supply chain moving, especially through its contribution to shipbuilding, and Japanese firm Shikoku Welding Electrode is one of the firms pushing this sector forward with its innovative solutions.

Founded in 1947, the company is oriented towards large-scale projects such as shipbuilding and construction providing state-of-the-art welding solutions for its customers. A good example of its forward-thinking products is the TAS-10 flux cored wire for all-position welding. Applicable to both ship and bridge building, the TAS-10 uses low-hydrogen type flux, mainly rutile, and was created for speed of use and a wide current range. The product also works to tackle spatter, a prominent problem in welding. Shikoku Welding president Yuichi Murakami explains that the company offers more services to help improve its customers’ experience: “Our staff sometimes go to shipyards to teach workers about how to more effectively use our products.”

Shikoku Welding has expanded from its original base in the shipbuilding city of Imabari, building a factory in Vietnam as the company looks to expand its presence in Southeast Asia with the help of sales partners. Vietnam is in a period of rapid industrialization and reviving its shipbuilding industry for the future. And so the Southeast Asian country particularly suits Shikoku Welding and its broad goal to contribute to society with its products that provide solutions in developing countries.

Welding has traditionally been a male-dominated industry, but Shikoku Welding is working to address this imbalance especially in the face of Japan’s aging population. Mr. Murakami says, “I’ve held meetings to discuss bringing in more women to our staff, asking what kind of a working environment would be best for them to feel comfortable and to work most efficiently.” This commitment to ensuring safe working conditions extends to Shikoku Welding acting as a trading company that purchases personal protective equipment (PPE), including specialized masks for welding. Through its fusion of innovation, quality and diversity, Shikoku Welding aims to continue making a positive impact as it expands.

Providing tailored solutions to meet market needs

In an industry transitioning towards growth in sustainable products, Soda Nikka continues to succeed through its customer-centric approach to targeted business expansion.

Founded in 1947, Soda Nikka has grown into a trading house focused on meeting the wide-ranging distribution and logistics needs of its clients, often small and medium-sized companies that require specialty chemicals. Takahiko Nagasu, President and Chief Executive Officer explains more. “Specialty chemicals meet very specific needs, and trading companies who deal with more generic products would often no longer be necessary. However, even basic chemical products can have different client specifications.

“We recognize that one of our roles is to deliver such basic chemicals to meet the needs of our customers in Japan, and in a timely manner.” This desire to do what is best for its clients has led Soda Nikka to work with manufacturers to ensure that even low-demand chemicals are not discontinued to the detriment of others. “We take a detailed picture of the customer’s needs and share it with chemical manufacturers,” Mr. Nagasu says. “Then we engage with them to create the right product.”

Finding a viable transition material to replace plastics will play an important role for Soda Nikka as part of its strategy for sustainable growth, with the company’s current focus being biodegradable resins. “We are working with manufacturers to develop applications and build platforms for reducing resin content and recycling resin products,” says Mr. Nagasu, who also highlights successes such as the re-pelletizing process for multi-layered plastic bottles.

Building on international opportunities, including flood defense systems in Indonesia, one area in mind is the advancing education sector in developing countries, which has increased infrastructure demands. As the president says, “our goal is to provide solutions tailored to the needs of the market.” And to help with this objective, Mr. Nagasu has forged a clear path for his employees, encouraging them to “think outside the box and keep their senses active at all times to capture what society needs, so that both they and the company can stay relevant.”
Water is an absolute necessity for the survival of all living things and one of the most essential sources of global economic activity. But currently the world is facing a serious water problem due to population growth and economic development. As well as water shortages due to climate change, another major problem faced worldwide is water pollution. In areas where sewerage systems are not widespread, human waste and other wastewater is discharged directly into waterways, contaminating our rivers and oceans.

In Japan, Johkasou is a facility that treats wastewater before discharging it safely and cleanly back into nature. Johkasou products are approved by the government of Japan and are extensively deployed across the country as part of government policy. As a matter of fact, about 10% of sewage in Japan is treated through Johkasou systems, with over 8 million running successfully in Japan.

“When it comes to wastewater treatment technology, Johkasou is unique to Japan,” says Hiroshi Ogame, President of Daiki Axis, one of Japan’s leading manufacturers of Johkasou. “However, since it is easy to imitate the technology, there is a fear that this business can be recreated by other companies. At the moment, there are already 11 local companies in Indonesia which have done so, but their products are offered at a much lower price and are of poorer quality. We are confident of the quality of Johkasou that we manufacture using Japanese technology. Quality is definitely our strength in this industry.”

With the quality of wastewater inflow to Johkasou usually not constant, regular maintenance is essential to the treatment process. For this reason, as well as manufacturing Joh-

Daiki Axis is looking to expand on its success in Japan by providing efficient and made-to-order wastewater treatment solutions to Southeast Asia and other emerging markets.

“We're looking to Southeast Asia, India and Africa as we develop the best wastewater treatment solutions.”

Hiroshi Ogame, President & CEO, Daiki Axis Co., Ltd.

“Project X Change”

www.daiki-axis.com/en/
Handled with care

A company committed to bringing creative ideas to life through meticulous craftsmanship, Union Corporation has established itself as Japan’s premier provider of door handles since it was founded more than 60 years ago.

Guided by its ‘Artware’ company philosophy, Union Corporation specializes in the manufacture of architectural components – chiefly door handles, an area in which the Osaka-based firm boasts a 90% market share in Japan. "Although it’s a product that may seem simple, its indispensability gave rise to Union’s founding," President Junzo Tateno says. "We’ve built the reputation as being the world’s first hardware manufacturer specializing in door handles."

A concept cultivated by the company since its founding in 1958, Artware “fuses the spirit of ‘art’ and ‘hardware’", Mr. Tateno explains. It’s a philosophy Union particularly began to embrace as it responded to the economic downturn caused when Japan’s price bubble burst in the early 1990s. "Artware is a keyword that denotes aesthetic sense, craftsmanship and design that resonates in the hearts of the customers," Mr. Tateno says. "After the bubble economy collapsed, the company shifted from mass production into more unique and creative product designs. A simple door handle emerged as an innovative art form. That new philosophy marked the turning point for our business and propelled us to reach a new level of perspective."

As many countries, including Japan, target carbon neutrality by 2050, Union focuses initiatives," Mr. Tateno notes. "We use long-lasting materials such as stainless steel, brass and cast iron. Depending on the life cycle of the building, 50 to 100 years on average, our products maintain their quality. For renovations, we collect used handles to be refurbished or re-cast. We seek alternative sources of energy, like propane gas, which is believed to be more environmentally-friendly than crude oil. We purchase used baseball bats from Mizuno, a sports equipment company, to be recycled and used in our wooden door handles. There have been many instances where we repurposed products from our clients instead of disposing of them."

With the exception of its China factory, opened in 2004, Union is a ‘fabless’ company – it outsources the manufacture of its designs. As it targets continued global growth, the firm plans to harness this commitment to establishing third-party partnerships. "Having a fabless production necessitates cooperation with external individuals, engineers or organizations to mutually come up with better solutions," Mr. Tateno says. "We’ve been working on several co-creation and research endeavors with foreign companies and architectural institutes. We truly believe there is a way to grow with affiliates around the globe." He adds: "Our company’s future sales will depend on where there’s a growing demand for new buildings – therefore, we are targeting countries around the world, including emerging economies or developing countries in Southeast Asia, the Middle East and even Africa."