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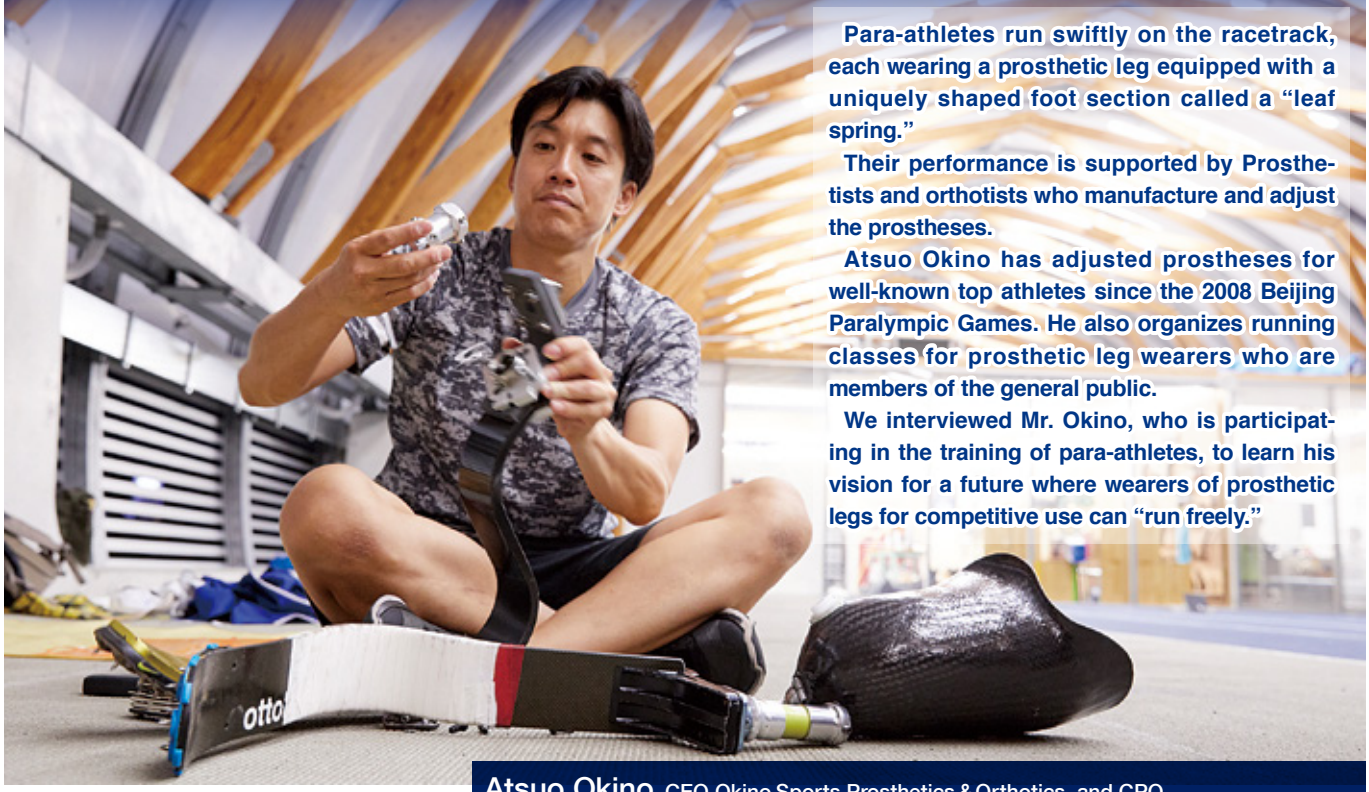
Special Feature

Opening Up the Future with Prosthetic Legs for Competitive Use

The Endeavor of a Prosthetist and Orthotist: Running with Runners

Opening Up the Future with Prosthetic Legs for Competitive Use



Para-athletes run swiftly on the racetrack, each wearing a prosthetic leg equipped with a uniquely shaped foot section called a "leaf spring."

Their performance is supported by Prosthetists and orthotists who manufacture and adjust the prostheses.

Atsuo Okino has adjusted prostheses for well-known top athletes since the 2008 Beijing Paralympic Games. He also organizes running classes for prosthetic leg wearers who are members of the general public.

We interviewed Mr. Okino, who is participating in the training of para-athletes, to learn his vision for a future where wearers of prosthetic legs for competitive use can "run freely."

Atsuo Okino CEO, Okino Sports Prosthetics & Orthotics, and CPO

Born in Hyogo Prefecture in 1978. After graduating from the Department of Mechanical System Engineering, University of Yamanashi, he trained in manufacturing prostheses in a vocational school and became a CPO. Established Okino Sports Prosthetics & Orthotics (OSPO) in October 2016.

Supporting athletes running with prosthetic legs via objective analyses and technical abilities

In a running stadium, we found a man working out with para-athletes in training. It was Atsuo Okino, a certified prosthetist and orthotist (CPO). CPOs are nationally qualified professionals who manufacture prostheses according to doctors' prescriptions and make the necessary adjustments in hospitals, etc. A "prosthetic limb" refers to an artificial leg/foot or arm/hand, while an "orthotic" refers to a device worn for treatment purposes in case of pain, damage, paralysis, etc., in limbs and/or trunk due to diseases, injuries, etc., Mr. Okino provides support for Atsushi Yamamoto, Japan's first Paralympic medalist, a prosthetic-legged track and field athlete, and for other internationally active para-athletes.

A CPO mainly manufactures the part called the "socket," which wraps the stump, or the residual part of the limb, and connects it to the prosthetic leg. It is the part that significantly affects the wearing comfort of the prosthetic leg. The CPO makes completely made-to-order prostheses by checking the width and length of the leg as well as the structure of the muscles to make a plaster cast so that the device fits the shape and movement of the stump of the wearer. On the day of the interview, Mr. Okino was testing a prosthetic leg for the javelin throw with Yuki Mano, Japan's national record holder in the Paralympic javelin throw, who has a lower limb amputation.

"If we compare it to the F1 race, a prosthetic leg is a racing car, the socket its seat, and the leaf spring that directly touches the ground its tire. The work of a CPO is like alignment adjustment, which is to adjust the angles and positional relationship between the car body and tires and wheels to improve the uneven wear of the tires."

While speaking and explaining, Mr. Okino carefully fastens the carbon-fiber reinforced plastic part called the leaf spring with screws. Mr. Mano wears the device, runs, and then gives his feedback, saying "I want to be able

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1 Titanium is used in the section that connects the socket to the leaf spring as the metal is lightweight and highly durable.

2 Mr. Mano wearing a prosthetic leg for competitive use and running at full speed. At present, Mr. Mano is the only javelin athlete using a transfemoral prosthesis in Japan.

to make the first step with my pivot foot a little smaller" and "I want the tip of the spike a little longer." Mr. Okino says, "If we do that, you will step forward by the length of the part, which will produce an opposite result from what you are asking for." He then suggests the installation of two clamps. He analyzes the subjective reactions of the athlete and adjusts the attachment angle of the leaf spring and the positions of the respective parts.

"Every athlete is trying to break the record. So, with each athlete I meet, I am staking my life," says Mr. Okino very clearly. Mr. Mano expresses his trust in Mr. Okino, saying "Mr. Okino's objective advice helps me when I have difficulties improving on my record." He says he has been working with Mr. Okino since approximately ten years ago.

Mr. Okino decided to become a CPO when he was a university student. It was the broadcast of the relay at the 2000 Sydney Olympic and Paralympic Games that inspired him. He had been active in track and field sports since his junior high school years, and was surprised to see athletes running with prosthetic legs.

"At that time, I didn't know either the word 'prosthesis' or its existence. I was so stunned that I simply watched athletes equipped with machinery running in the stadium," says Mr. Okino, looking back at those days. He felt that the two spheres of what he desired to do, mechanical system engineering and track and field sports, had overlapped, and he threw himself into research on prosthetic legs. After graduating from the university, he furthered his study in a vocational school and acquired the qualification of a CPO. He accumulated practical experience, starting from 2005, and went independent to establish Okino Sports Prosthetics & Orthotics (OSPO) in 2016. Currently, he provides support to top athletes, and at the same time, manufactures and adjusts prostheses and orthoses for many wearers.

A scene from the OSPO Running Class. Para-athletes also take part in the class.

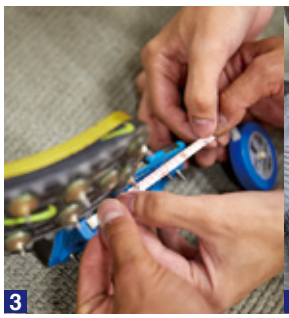
"I want as many prosthetic leg wearers as possible to feel the joy of running"

Mr. Okino has held an OSPO Running Class once a month since the establishment of OSPO. In this class, where active athletes take part as supporting staff, Mr. Okino teaches the correct way of walking with prosthetic legs for daily use and using a leaf spring, and also runs on the track with the participants.

"What makes me happiest is to see smiles on the faces of children who had given up running because of their prosthetic legs, running with all their might, and the parents happily watching them," says a smiling Mr. Okino, who himself is a father of a child. As of 2018, the number of lower limb amputees in Japan is approximately sixty thousand, of which thirty compete, wearing prosthetic legs for competitive use in formal track and field events; only approximately fifteen are good enough to compete in the Paralympics. For competitive use, a prosthetic leg must be replaced with a newly purchased one to suit the physique of the wearer, and the replacement is not covered by insurance, which causes a significant financial burden. This is one reason for the sluggish growth in the number of para-athletes. Mr. Okino says, "Hopefully, children and their parents will pass the time running together, which will make them interested in competitive sports and think 'I want to run faster' and 'I want to be a Paralympic athlete.'"

"A prosthetic leg that will make the wearer unconscious of wearing the device and feel as if it were his/her own leg is the ideal prosthetic leg," says Mr. Okino. "In order to make such a device," he continues, "there is only one thing a CPO can do." It is not only to manufacture the prosthetic leg but also to meet as much as possible the various requests of the wearer that arise when he/she starts using the device, which is the reason why Mr. Okino wants "to be around like a family member" for prosthetic wearers, who can seek his advice on any issue however small it may be.

Mr. Okino regards the upcoming Tokyo Olympic and Paralympic Games in the summer of 2020 as a good opportunity for the further recognition of Paralympic Track and Field Games and for promotion of the use of prosthetic legs for competitive use. He believes that prosthetic legs for competitive use have the potential to create a future where prosthetic leg wearers running freely are something you will often see.



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3 A spiked sole is attached to the front end of the leaf spring. A difference of just several millimeters in the attachment position will give a significantly different feeling to the athlete.

4 Making adjustments based on conversations with the athlete.

The information in this article is accurate as of October 2018.

Usina Coruripe Plant Campo Florido Unit

Usina Coruripe was founded nearly 100 years ago in Brazil, the world's leading sugar-producing country. In the company's factories, which produce sugar and ethanol, valve positioner failures sometimes occurred. Fortunately, Usina Coruripe found a high-quality and highly reliable positioner that can be used with all manufacturers' valves, and with valves of various specifications. As a result, plant operation has stabilized, repair costs are down, and the burden on workers has lessened.

Failure of valve positioners used in sugar and ethanol production presented a problem

Brazil is the world's largest sugar-producing country. It has strong economic ties with Japan, with many Japanese companies doing business in Brazil. Usina Coruripe was founded in 1925 in the city of Coruripe on the southern coast of state of Alagoas in Brazil. As it expanded its sugar production business, Usina Coruripe also began producing ethanol from sugarcane for use as automobile fuel, and is now one of the 10 largest companies in Brazil in sugar and ethanol production. In addition, the company generates power from biomass, an eco-friendly energy source, mainly for running its own plants.

One of the company's main plants, the Campo Florido Unit, can process 4.4 million tons of sugarcane annually. The produced sugar is sold not only to domestic and overseas markets, but also under Coruripe's own brand, which is distributed mainly for household use in Minas Gerais, Alagoas, and other states.

The Campo Florido Unit's sugar and ethanol production processes include fermentation, processing of the remaining material after stripping and crushing sugarcane, drying, evaporating, crystallization, and refining. In the past, the positioners that controlled the valves for various processes often malfunctioned, with a high probability that repair would be needed. Usina Coruripe has a number of factories with similar production processes at various domestic locations, so the challenges it faced affected the entire company.

"Every time we had a breakdown, we had to shut down the plant, lowering its availability factor. So we tested positioners from multiple manufacturers to find a cost-effective product with fewer failures," says Electricity and Automation Maintenance Coordinator Wilson Angelo de Menezes Junior.

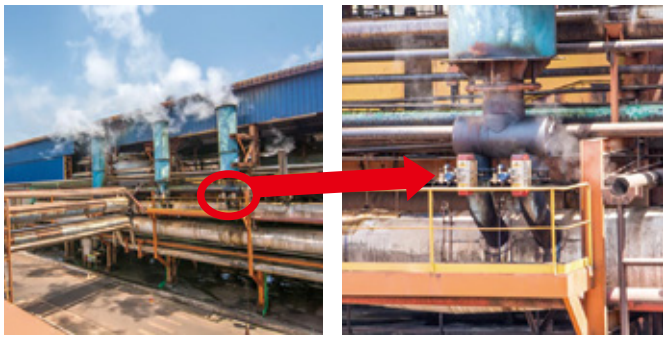
Selecting a reliable product to improve productivity and reduce workload

In the examination of many manufacturers' positioners, the quality and cost effectiveness of Azbil Corporation's smart valve positioners became apparent through actual demonstrations. The plant utilizes valves made by a number of manufacturers, both Brazilian and foreign. If a positioner fails,

Household sugar sold as the company's own product

In-house training kit

Azbil's smart valve positioner attached to a valve that controls the flow of syrup during the processes of boiling down syrup and producing crystals (decoction and crystallization). The positioner is installed using a mounting plate which differs in



Azbil's smart valve positioner attached to a steam release valve

the company must ask the manufacturer for repair, which is a heavy burden on the maintenance site. Azbil's smart valve positioner received high marks for its compatibility with various manufacturers' valves of differing specifications used at Campo Florido, as well as for its quality and cost-effectiveness. Azbil's positioner was selected in June 2018. In July of the same year, smart valve positioners and 10 sets of mounting plates for installation on other companies' valves were delivered, and the positioners began operation.

"Although we do our best to improve the quality of the plant instrumentation air, we cannot completely prevent contamination by water and oil. In operating Azbil's positioners*, we found that they continue to operate without failure better than other manufacturer's positioners," says Wilson Angelo de Menezes Junior.

In addition, the installation and adjustment of positioners differ depending on the valve manufacturer, so with many brands of positioner the operators must learn many different procedures. However, since Azbil's positioners can be mounted on any manufacturer's valve, it is now possible to handle all valves by learning just one installation procedure and adjustment procedure.

"If positioners are standardized throughout the entire plant, we can reduce the workload on the staff. Azbil's positioners are less likely to break down, are easier to maintain, and put less of a burden on the staff. Although it has only been a year since they were installed, they have earned a high level of trust," says Instrumentation Supervisor Cacinildo Silva.

Not only have repair costs been reduced, thanks to the elimination of failures, but also the standardization of positioners has made quick replacement work possible. As a result, the time required to stop the plant has been shortened, and the plant's availability factor has improved.

"The most important thing is that the equipment continues to operate. For that purpose, a situation in which no products fail is a must. Sugar and ethanol production processes run for 7 to 8 months, leaving a 4 to 5 month outage for regular repairs. If the equipment stops due to a positioner problem during the 7 to 8 months of operation, production efficiency is greatly affected. By changing to Azbil's positioners, we were able to increase availability and production efficiency," says Plant Manager Geovani Araujo da Silva.

Additional product installation considered for continuous and stable operation

In addition to improving plant operation efficiency and productivity and reducing workload, the company has effectively used training kits to promote onsite efficiency.

"The training kit was very helpful for workers who were learning start-up and other procedures. We used this kit for testing before actually installing the positioners, so we were able to do the actual work with confidence," says Cacinildo Silva.

"To continue to increase the productivity of the entire plant, we plan to introduce more Azbil's positioners when we expand the facility. Also, we are considering introduction of the positioner at other plants. Thanks to the good responsiveness after delivery and the high reliability of the product, we are looking forward to Azbil's continuing support as our business partner," says Wilson Angelo de Menezes Junior.

Usina Coruripe Plant Campo Florido Unit

Address

Fazenda Santa Adelaide, Estrada Cruzeiro do Sul, Km 42. CEP: 38130-000–Campo Florido/MG

Beginning of Operation

2002

Business

Manufacture and sale of sugar, ethanol, feed, and fusel oil

Coruripe Energética Campo Florido Unit

Address

Fazenda Santa Adelaide, Estrada Cruzeiro do Sul, Km 42. CEP: 38130-000–Campo Florido/MG

Beginning of Operation

2008

Business

Biomass-based power generation and sales

Geovani Araujo da Silva
Plant Manager
Usina Coruripe
Campo Florido Unit

Wilson Angelo de Menezes Junior
Electricity and Automation Maintenance Coordinator
Usina Coruripe
Campo Florido Unit

Cacinildo Silva
Instrumentation Supervisor
Usina Coruripe
Campo Florido Unit

* The positioners used in the plant are designed in such a way that the section housing the electric and electronic parts are isolated from the air circuits, thereby reducing the risk that the instrumentation air, which contains oil and moisture, affects those parts.

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After Twenty Years of Growth, Azbil Korea Enters a New Phase

The company aims to grow in a wide range of fields while staying close to customers, valuing employees, and deepening relationships with the community

Azbil Korea Co., Ltd., was founded in 1999 as Yamatake Korea Co., Ltd., and celebrated its 20th anniversary last year. The company has continued to grow, mainly in the building and industrial markets, and in recent years has focused on the service areas of each business in order to expand. With the aim of continuous development, Azbil Korea is active not only in expanding its business, but also in fulfilling its corporate social responsibility (CSR) and improving the workplace environment so that employees can work comfortably.

Twenty years of great strides in the building and industrial markets

The azbil Group company Azbil Korea Co., Ltd., was founded in March 1999 in the Yeouido (Yeo-ui Island) district of Seoul. Yeouido is a large, busy, and energetic administrative and economic center. South Korea at that time was just at the beginning of a period of remarkable growth in production activity. In that environment, Azbil Korea launched a building automation (BA) business that handled the air conditioning of large-scale buildings and an advanced automation (AA) business that focused on products such as control valves and field devices for factories and plants.

Cho Dongrae
President
Azbil Korea Co., Ltd.

The BA business has delivered a large quantity of central monitoring and control systems, including automated air-conditioning control equipment, to newly built office buildings and factories. In the future, in addition to handling an increased number of new construction projects, the company plans to focus on maintenance services*1 and energy-efficiency projects for existing buildings and customers. In Japan, many energy-saving solutions have already been provided to customers, but in South Korea they have only recently begun to receive attention. Azbil Korea's proposals to customers will not stop at automatic air conditioning control, but will also consider how to reduce life-cycle costs, and will include energy-saving plans and improvement measures that are tailored to the operation of the building.

A party held to commemorate the 20th anniversary. Customers of Azbil Korea were also invited to attend the lively event.

The AA business is threefold: a product business selling transmitters, valves, etc., mainly to oil and steel plants, a solutions and services business in which system products and solutions are combined, and a control product business selling sensors, switches, etc., mainly to semiconductor and automobile factories.

Areas covered by the AA business include petroleum, chemicals, electrical and electronic equipment, semiconductors, steel, ships, and fine chemicals, all of which are major industries in South Korea. The majority of sales are in the electrical and electronic equipment and semiconductor markets, but since these areas are sensitive to economic condi-

The office was moved in the 20th anniversary year. In the spacious new office, employees are allowed to freely change desks.

There is also space for promoting employee communication and a place for employees to relax.

tions, Azbil Korea also emphasizes the pharmaceutical and food markets. In the AA business, the company is strengthening its employee training to improve the technical skills of sales representatives. With the cooperation of Azbil Corporation, it provides training to employees and sales agents in the areas of product knowledge, customer service, and solutions proposals.

Leveraging strengths as a trusted partner, and further strengthening services

Both the BA and AA businesses aim to strengthen their service business in the future. To enhance sales capabilities in the AA service business, Azbil Korea has reshuffled its organization to form a sales team specializing in services. In the BA business for the past three years, Azbil Korea has been laying foundations by drawing upon the instrumentation technology and solutions know-how accumulated over many years by Azbil in Japan. For renovation of existing buildings and energy-efficiency projects, which are the mainstay of the service business, opportunities arise while talking directly with building owners, so knowledgeable and experienced employees are assigned to that role.

In the AA business in particular, the reason for the new focus on service is the steadily growing interest and demand among customers in South Korea for automatic operation of factories and plants using the Internet of Things (IoT) and artificial intelligence (AI). To meet this need, in the future Azbil Korea will, for example, combine products and applications such as Azbil's Control Valve Maintenance Support System and Network Instrumentation Modules to provide a comprehensive package addressing customer needs and providing solutions, rather than simply delivering products.

One customer remarked, "Some vendors offer low-priced products, but after delivery their response slows down. However, Azbil Korea provides support for operation even after sales, and responds promptly if something goes wrong." Azbil Korea receives this kind of high praise from customers for its ability to provide support with a personal touch. Customers who have experienced this kind of response often purchase products afterwards, which is an important strength of Azbil Korea. As a major base for measurement and control equipment manufacturers in Asia, the challenge for the company is to develop customers' sites to meet their needs and to provide continuous support after automation. Its commitment does not end with the delivery of products. As a company that looks after its customers all the way, and a long-term partner who grows with the customer, Azbil Korea aims to take advantage of its strengths while building its service business.

With a focus on CSR and workplace environment, a company that can keep on growing

Azbil Korea is actively working to fulfill its CSR and to create workplaces where employees can work comfortably.

The Employees' Association, which is operated voluntarily by employees, collects membership fees from employees to make donations to facilities for childcare and the elderly. Its various activities also include visiting these facilities to plant potatoes, do cleanup, and make kimchi in winter. Employees understand the importance and significance of CSR, and actively participate. Some employees also bring their families along. Employees appreciate the pleasant sense of accomplishment that comes from working together and the feeling of a deep connection with the local people.

As for the workplace environment, bottom-up suggestions for improvement of the system are coming from employees. In South Korea, the number of double-income households is increasing, so new environmental and institutional measures have been adopted, such as creating a break room where pregnant employees can rest, and introducing a flextime system for employees with children.

Thanks to the support of customers in South Korea, as well as the energy of its employees, Azbil Korea has grown and developed, and now celebrates its 20th anniversary. The company intends to continue creating an environment where all employees can fully realize their potential through flexible and diverse ways of working.

Through the creation of a comfortable working environment, employees will increasingly trust the company and will work over the long term to enhance their own capabilities, which will lead to the continued growth of Azbil Korea.

Going forward, Azbil Korea will continue to grow step by step, walking side by side with customers in South Korea, and providing optimal products and solutions.

∗1▶Service
Service engineers familiar with the equipment and systems in buildings, plants, factories, etc., provide optimal operation, do periodic inspections, and handle maintenance. In addition to responding to urgent problems quickly, they meet various customer needs, such as collecting data at remote locations, providing remote maintenance, analyzing collected data, and proposing solutions.

Keywords A to Z Vol. 24

Keyword Environmental, Social, Governance (ESG)

An abbreviation for the words environmental, social, and governance; the idea that these three viewpoints are necessary for the sustainable growth of society and of companies.

Environment, society, and corporate governance receive worldwide attention

In April 2006, the then UN Secretary-General, Kofi Annan, announced an initiative. It was the promotion of Principles for Responsible Investment (PRI)—principles that incorporate environmental, social, and governance issues into the investment process. The background of this initiative was the pursuit of short-term profits and a tendency to put sales above all else. Mr. Annan argued that, in order to make effective long-term investments, the financial industry should depend not only on quantitative assessments of financial information such as cash flow or profitability, but also on non-financial information such as environmental, social, and governance matters.

Now, after more than 10 years have passed, ESG issues are increasingly attracting attention, and an emphasis on ESG has become a major trend among global investors. This can be inferred from the fact that, according to a survey,* ESG-related investments in 2018 reached approximately $30.683 trillion.

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Why is ESG attracting attention?

One viewpoint current in the capital markets is that it is indispensable for the pursuit of long-term investment returns to minimize the impact of environmental and social problems and create a sustainable society as a whole. In line with this perspective, ESG investment is based on the idea that recognizing the importance of environment, society, and corporate governance issues ultimately leads to the sustainable growth of companies and the expansion of medium- to long-term profits, and also allows the discovery and removal of risk that is difficult to see in financial indexes. For example, consider a country's pension fund that has a long-term time horizon and does not hold shares directly, but is a universal owner of a large amount of assets managed by external organizations. Multiple financial institutions holding the fund's assets manage them as instructed by the pension fund. For this reason, if the fund places importance on ESG, companies whose management is actively ESG-conscious will be selected as investments, resulting in the sustainable growth of society as a whole, as well as long-term stable returns.

Nowadays in capital markets, ESG has become an important consideration for investment. Companies wishing to attract investment must actively address ESG issues in order to be positively evaluated in the market.

What exactly is included in "ESG"?

What, then, are the specific elements of ESG?

Actually, there is no global standard for "ESG." A number of ESG evaluation agencies have put out evaluation details based on their own standards. Here are some typical elements.

Environmental: Countering climate change (cutting back and reducing CO_2 emissions, etc.), contributing to biodiversity, preserving water resources, etc.

Social: Improving working conditions, respecting human rights (such as hiring without discrimination), community service, sincere and fair procurement, diversity promotion, etc.

Corporate Governance: Transparent governance, risk management, etc.

Along with actions, proactive information disclosure is important

ESG might seem to be difficult, but many of the typical elements have already been worked on by many companies. For years, many companies have worked to reduce carbon dioxide (CO_2) emissions and prevent environmental pollution, and are eager to contribute to the community.

However, even though they tackle these issues, companies will not be considered for ESG investment unless their activity is known to investors. In other words, information disclosure is very important.

ESG evaluation agencies evaluate companies based on the disclosed information. Companies must clearly disclose the details of their efforts, as well as their policy for the future and data that can be used for objective evaluation. For example, "We think water is precious" is not enough. It is important to disclose specific and objective information such as a goal of "reducing water usage by XX% by year XXXX," or a report on tree planting activity for water resource conservation.

Since it has an impact on stock market valuations, we will be seeing more and more ESG information in the future.

*Global Sustainable Investment Review 2018, published by the Global Sustainable Investment Alliance.

Cover photo: Brazil, by Koji Mizutani, Merry Project representative director

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