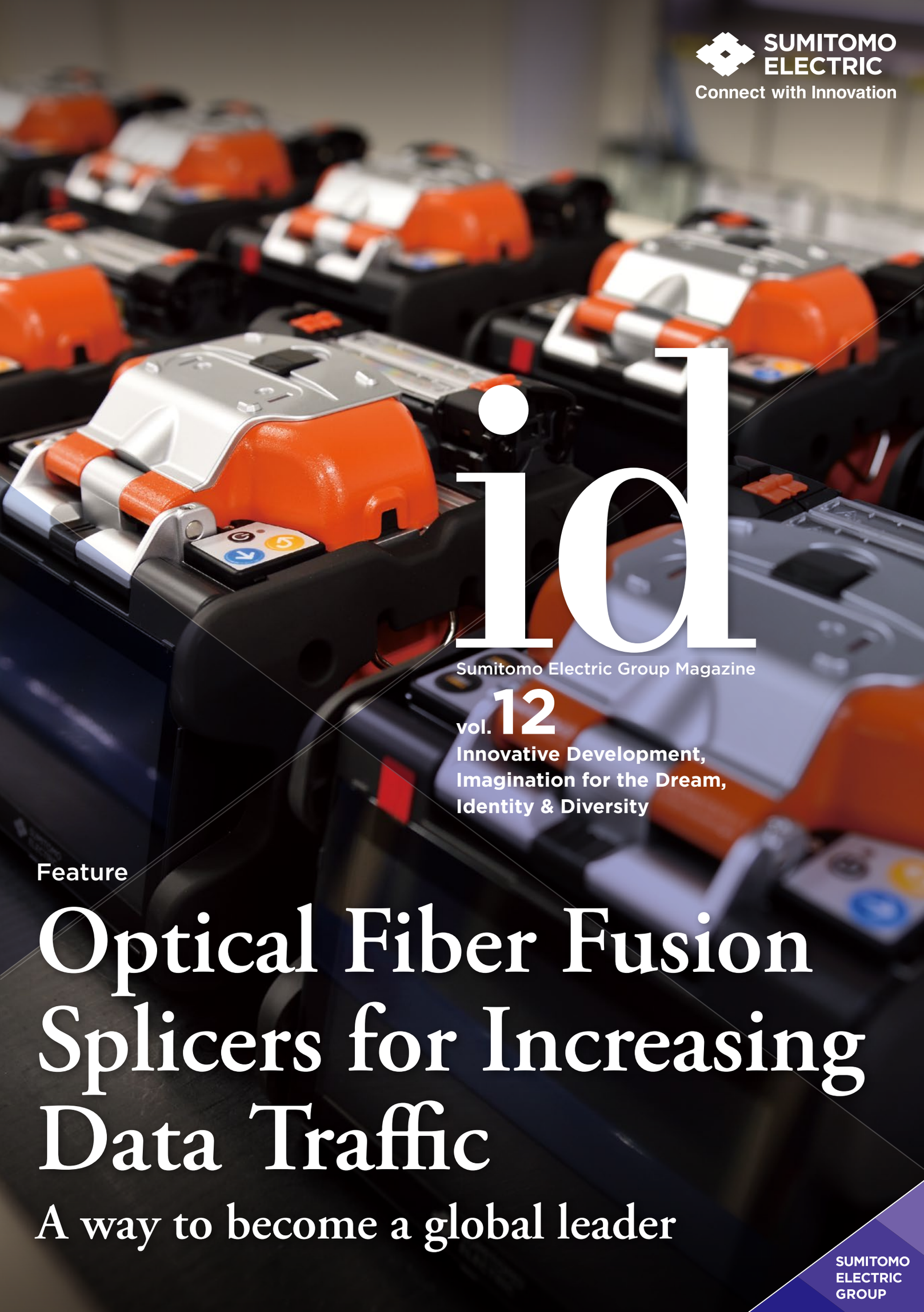


SUMITOMO ELECTRIC
Connect with Innovation

id

Sumitomo Electric Group Magazine

vol. 12

Innovative Development,
Imagination for the Dream,
Identity & Diversity

Feature

Optical Fiber Fusion Splicers for Increasing Data Traffic

A way to become a global leader

SUMITOMO ELECTRIC GROUP

Fiber optic cables have now been installed throughout the world, including in Japan. As fiber-to-the-home (FTTH) networks have widely spread, people are increasingly benefiting from data communication services through the use of the Internet and mobile devices. Fiber optic networks, connected throughout the world, fundamentally support the transmission of large amounts of data, which have been increasing each year. To construct such networks, it is crucial to use fiber optic connection technology. This technology is classified into permanent connections—comprising fusion and mechanical splicing—and removable connections using connectors. For connecting long-distance and large-capacity trunk lines, fusion splicing is essential, in which optical fibers are fused together using the heat generated by electrical discharge between electrodes.

The Sumitomo Electric Group undertook the development of an optical fiber fusion splicer in the 1970s. Since the launch of the first unit in 1980, the Group has led innovations as one of a handful of pioneering Japanese manufacturers, and has contributed to constructing global fiber optic networks. A reduction in splice loss and productivity and quality improvements in splicing work have remained constant challenges facing fusion splicers. It is no exaggeration to say that the history of the efforts that the Sumitomo Electric Group has directed toward solving these challenges is the history of fusion splicers. The daring endeavors of the Sumitomo Electric Group in facilitating the evolution of fusion splicers sustain fiber optic networks and the advanced information society. And now, the Group is making its way steadily to become a global leader with its profound product development capabilities and extended sales and maintenance frameworks implemented throughout the world.

Fundamental Support for the Construction of Expanding Fiber Optic Networks

Fusion splicers critical for increasing data traffic

5G base station installation at Mount Everest

Path of a Pioneer in Fusion Splicers

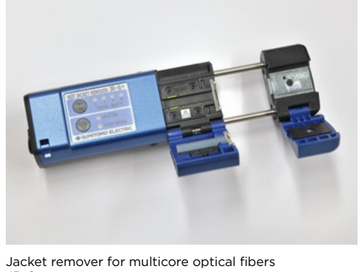
Optical network construction required reduced splice loss

Reliable communication quality was required

An arc discharge is a class of gas discharge, in which two electrodes and the gas between them reach a high temperature and emit strong light, as used in welding and other applications. A fusion splicer is a device that joins the ends of optical fibers placed on the right and left instantaneously by melting the ends with heat of approximately 1,800°C generated by an arc discharge.

The fibers used for optical communications are made of silica glass. The inner part of the fiber has a central core and a layer known as cladding around the core. They are arranged in a concentric form. Optical signals entering the core propagate through the core, being repeatedly reflected at the interface between the core and the cladding. Furthermore, optical fibers are divided into two types: single-mode fiber (SMF) and multi-mode fiber (MMF) with a thin core and a thick core, respectively, through which light passes. The core of an SMF is extremely thin, at 9.2 µm (0.0092 mm) in diameter. It reduces attenuation to a minimum using a single mode of propagation for optical signals and is suitable for high-speed, long-distance transmission. In contrast, the core of an MMF is 50 or 62 µm in diameter. The transmission of optical signals in more than one mode is subject to lags in signal arrival time, possibly impairing the normal operation of electronic devices. Being unsuitable for high-speed long-distance transmissions, MMFs are generally used in optical cables on premises. One challenge associated constantly with these optical fibers has been attenuation. When light goes through an optical fiber, the light partly scatters from the optical fiber or generates slight lags in transmission speed due to the use of different wavelengths, causing attenuation (transmission loss). While the Sumitomo Electric Group has delivered world-class low-transmission-loss optical fibers, reduction of splice loss that occurs when connecting optical fibers was also required to construct high-speed and highly reliable optical communication networks.

First fusion splicer
TYPE-3



Jacket remover for multicore optical fibers
JR-6+

Splicing optical fiber ends in order of submicrons

Fusion splicing joins the ends of cores through which light is transmitted. Currently, the fiber most popularly used for optical network communications is the aforementioned SMF. Its core is 9.2 µm (0.0092 mm) in diameter. Such very thin cores must be correctly aligned for splicing. If a misalignment or angular deflection occurs between the light axes of two optical fibers, or a gap is created between the ends of the optical fibers, the result is a splice loss due to reflections attributable to a difference in the refractive index between the optical fiber and air. For example, a slight axial deviation of 1 µm (0.001 mm) causes a splice loss of 0.2 dB. Therefore, it is necessary to join the ends of optical fibers with submicron precision. Reducing splice loss was a significant challenge. The Sumitomo Electric Group overcame various technical challenges and, in 1980, launched its first fusion splicer, the MMF fusion splicer (TYPE-3). Using this fusion splicer, the operator spliced optical fibers while looking into a microscope for direct observation of the peripheral positions of the optical fibers. Thus with large-core-diameter MMFs, it was possible to reduce splice loss, although this depended on the operator's skill and proficiency. Meanwhile to deal with SMFs with a core diameter about one-fifth that of MMFs, in 1982, the Group developed a fusion splicer (TYPE-11) that performed optical fiber alignment. This fusion splicer carried out fusion splicing by placing a light source at one end of an optical fiber, opposite to the splice, and a photoreceptor at one end of the other fiber, and aligning the cores to maximize the amount of light received. However, there still remained many challenges, such as the troublesome work of placing a light source and a photoreceptor at locations several hundred meters to several kilometers away from each other and the amount of time required for splicing.

Toshihiko Honma
Department Manager, Mechatronics Department,
Lightwave Network Products Division

Development of core-aligning fusion splicers of the direct-core-monitoring type

The Sumitomo Electric Group's development team produced a direct-core-monitoring technology to observe the optical fiber cores with a microscope and to automatically align them. In 1984, a fusion splicer (TYPE-33) was launched, featuring the technology that allowed for directly observing optical fiber cores with a microscope equipped with a high-resolution, high-powered objective lens. Moreover, the image-capturing system of TYPE-34 incorporated a CCD camera. This technology enabled observation of the optical fiber cores and self-alignment of the cores.

However, there were still challenges to be addressed. At the time, soon after joining the Company, Toshihiko Honma, current Department Manager of the Mechatronics Department, Lightwave Network Products Division, worked on the development of the fusion splicer.

"At the time, fusion splicers were increasing in both weight and volume, incorporating components such as a CCD camera, control circuits and a monitor for image processing. As optical fibers came into wider use, fiber installation work began to take place in various environments. As such, there was a rise in demand for superb compact and light fusion splicers. The Group developed smaller and lighter fusion splicers, using small image sensors typified by CMOS,[*1] application-specific LSI[*2] and multilayer high-density wiring boards. At the same time, to fulfill the growing need for fusion splicers usable in locations where AC power was unavailable (e.g. manholes and elevated sites), in the late 1990s, the Group developed battery-powered models. In 2000 and subsequent years, small, light and battery-equipped fusion splicers went mainstream. Moreover, around that time, with the increasing proliferation of optical fibers on a global scale, the fundamental features incorporated in today's fusion splicers were achieved, including improved environmental resistance (wind and shock resistance) adapted to harsh outdoor installation work in Japan and abroad. Additionally, maintenance services and accessories vital for fusion splicing, such as cutters and protective sleeves, were fully improved. These items were made possible by the Sumitomo Electric Group's materials technologies. The FC-8R cutter incorporating the Group's proprietary self-rotating blade technology holds the largest share in the global market," says Honma.

*1 Complementary metal-oxide semiconductor
*2 Large scale integration

Optical fiber cutter
FC-8R

In the 1980s and 1990s, the aforementioned process of fusion splicer development took place often as a joint project between Sumitomo Electric and its competitors, with participation by a telecommunications carrier. A phase of harsh competition in terms of development began after the turn of the millennium. Thereafter, the Sumitomo Electric Group's original technologies led the evolution of fusion splicers.

An Innovative History of Fusion Splicers Boldly Meeting Challenges

Revolutionary models developed with a vision for the next generation

Dual heater substantially improved work efficiency

In response to societal demand for high-volume data transmissions, today it is required to make multi-core optical fiber connections more efficient. A core is an optical fiber element of usually about 0.25 mm in outside diameter, which is a plastic-coated glass fiber. A multi-core optical cable is a bundle of hundreds to thousands of cores. Fusion-splicing methods used to achieve batch splicing of a multi-core cable include the stationary V-groove alignment method, which uses high-precision V-grooves to align optical fibers, and the surface tension-based core alignment effect that takes place when melting optical fibers. Fusion splicing is carried out using the following steps. First, a fiber protection sleeve is used to protect a fiber to be exposed at the splicing point. Next, the cladding is removed to expose the glass portion of the optical fiber. This is followed by fiber cleaning, after which the fiber is cut. The cutting affects the loss characteristics resulting from fusion splicing. The quality of the cut surfaces is critically important. Subsequently, the optical fiber ends are fusion-spliced by an electric discharge. The fusion splice is covered with the fiber protection sleeve and the core is reinforced on a heater.

Regarding this sequence of fusion splicing steps, the Sumitomo Electric Group took note of the length of time required for reinforcing the fusion splice in the final process. In 2000, fusion splicers required about 10 s for fusion splicing. In contrast, the time required for reinforcement by heating was about 50 s, causing a delay in the operation. Expectations were high for reduced reinforcement time with the aim of shortening the optical cable installation period. For a breakthrough in the situation, a faster heater was developed to reduce the reinforcement time to 35 s. Furthermore, the world's first dual heater with both heating and reinforcement features was incorporated to substantially improve work efficiency.

Development based on the Forgiving Splicer concept

In 2011, TYPE-71C was launched, which was the base model of the current flagship product TYPE-72C+. TYPE-71C was a product that became a major turning point in the history of the Sumitomo Electric Group's fusion splicers. The project launched at the time to beat the competition was an ambitious one, forecasting, several years ahead, the next models that would be released by competitors, so as to develop superior products.
The development was based on the Forgiving Splicer concept. The intention behind it was to develop a fusion splicer that would minimize dependence on the work environment or on the operator and make fusion splicing simple. Hiroshi Takayanagi, Department Manager of the Mechatronics Department, Sumitomo Electric Optifrontier Co., Ltd. was among the members who worked on the development of TYPE-71C together with the aforementioned Honma.

"There was a mountain of development challenges. In addition to the sophistication of basic performance elements, such as stabilizing splice quality against abnormal ends of optical fibers, a self-determination function for diverse fusion conditions of optical fibers, improving the accuracy of estimated splicing loss, fastest-possible splicing and fastest-possible reinforcement, the tasks included further downsizing and weight reduction, enhancing dripproof and dustproof performance for adaptation to environments around the world, boosting user-friendliness such as through the industry's first incorporation of a touch panel, and fusion splicer diagnosis via the Internet. All were new challenges. The point was how it would be possible for users to make the best use of the fusion splicer. While fusion performance could not be differentiated to a great extent, we focused meticulous attention on basic performance and on the user interface to deliver TYPE-71C," says Takayanagi.

TYPE-71C had a revolutionary impact on the world of fusion splicers. For example, self-determination of fusion conditions began when, in the late 2000s, optical fibers with enhanced bending properties for indoor fiber installation proliferated and the need arose for fusion splicers to adapt to such fibers. It became necessary to meet different fusion splicing conditions from those of SMFs. As such, the operator needed to change splicing conditions with each type of optical fiber to be spliced. The wrong setting resulted in qualitative defects such as increased splice losses. To solve this problem, Honma, Takayanagi and other members pursued the creation of a high-powered, high-resolution observation system and developed the capability of automatically determining optical fiber cores by processing captured optical fiber images. This function enabled the operator to achieve high-quality fusion splicing without the need to check the optical fiber type. Moreover, in 2013, the Sumitomo Electric Group developed a compact fusion splicer that featured the world's smallest and lightest body. In addition, a fusion splicer incorporating a touch panel for improved ease of operation was commercialized.

Fusion splicer diagnosis via the Internet is also the industry's first milestone capability. This is a fusion splice management system comprising IoT-enabled fusion splicers. Named SumiCloud®, the system was embedded in the small and light fusion splicer TYPE-71C+ and was launched in 2015. SumiCloud® equipped with wireless LAN capability and connected to a cloud server stores and manages data such as images and other fusion splice information and location information. It substantially lightens the workload for on-site operators. At the same time, it enables the manager to oversee installation work and fusion splicer conditions remotely in real time. These achievements realized in TYPE-71C+ are also incorporated in the current flagship product TYPE-72C+.

Technical traditions at the base of advanced technologies

Masahiro Toriumi of the Mechatronics Department of Sumitomo Electric Optifrontier Co., Ltd. is a current member in charge of producing TYPE-72C+. Toriumi is enthusiastic about the technology used to see the ends of optical fibers with high resolution.

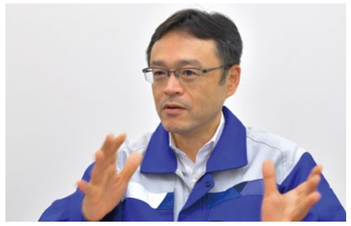
"Our mission is to ensure optical fiber splices with stable quality. To that end, a technology that enables observation of optical fibers with high resolution is vital. Such a technology involves years of experience and the expertise of our foregoers. Currently, we also stick to the technology used for seeing. The very starting point of fusion splicing is observing optical fiber conditions," says Toriumi.

The Sumitomo Electric Group's technical traditions are also alive in other aspects of its fusion splicers, as well as in the technology used for seeing. A major mission the Group is working on to continue these traditions is human resource development.

"Fusion splicers have improved in terms of ease of assembly, with improvements made in product design and the production process in comparison with the early development stage. However, some important processes still require the skills of experts. To deliver the world's best-quality fusion splicers to our customers, it is important to hand down years of experience and expertise from our Predecessors," says Toriumi.

Addressing accelerating market needs is an urgent challenge. Accordingly, it is necessary to reduce lead time, and to that end, the time required for human resource development drawing on traditions is important. The Sumitomo Electric Group has boldly met this apparently contradictory challenge with positive achievements. The following sections explore the underlying secret behind this success.

Each unit is assembled by skilled hands.



Hiroshi Takayanagi
Department Manager, Mechatronics Department, Sumitomo Electric Optifrontier Co., Ltd.

Direct-core-monitoring optical fiber fusion splicer TYPE-72C+ launched in October 2020

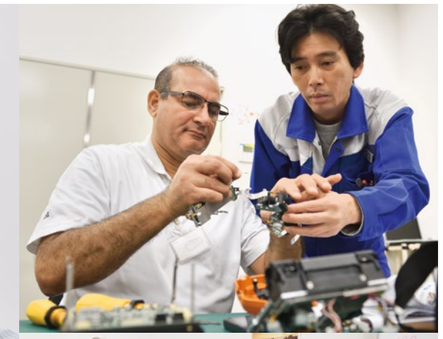
Masahiro Toriumi
Assistant Manager, Manufacturing Section 1, Shonan Works, Mechatronics Department, Sumitomo Electric Optifrontier Co., Ltd.

SumiCloud® communications card

Production Frameworks and Flawless After-sales Follow-ups

Developing human resources to meet user expectations

Personnel from the United Kingdom, China, India, Singapore and other countries receive maintenance training.



Production frameworks established to precisely respond to market needs

The Shonan Works of Sumitomo Electric Optifrontier Co., Ltd. is a fusion splicer production base located in Chigasaki, Kanagawa Prefecture. Its flagship fusion splicer models consist of the TYPE-72C+ family, which is used to connect the long-distance and large-capacity trunk lines mentioned earlier; the TYPE-72M family used for multicore mass splicing at, among others, data centers in North America; and the TYPE-201 family, which features the world's smallest and lightest units that are efficient in limited work spaces when installing fibers on customer premises or between utility poles. In addition to these products, the works produces optical fiber cutters that come with the Sumitomo Electric Group's proprietary self-rotating blade mechanism and light and compact jacket removers used to remove the jacket for fusion splicing. These products are highly regarded around the world. The production base is overseen and managed by Kensuke Ito, Works General Manager. Ito points out that fusion splicers are exceptionally high-precision products.

"Optical fibers are spliced in order of submicrons. This means that fusion splicers are produced with high precision. That level of precision can only be accomplished with human hands. Of course, automation has been positively incorporated, but the final intricate adjustments require an expert's skills. For this reason, the challenges that the works addresses include training of personnel to inherit expert skills. Another important thing is that market needs are shifting quickly and are becoming more diverse. Changes in supply and demand are also significant. Meanwhile, competition is becoming fierce due notably to emerging Chinese manufacturers. We plan to shift from the make-to-stock style to the make-to-order style. Additionally, we intend to build a novel production framework that can swiftly coincide with market demands and benefit from cost advantages," says Ito.

Training maintenance personnel from different countries

Fusion splicers are high-precision products and, as such, it is extremely important to ensure proper maintenance for them. This involves after-sales follow-up in addition to developing and manufacturing the product. The point is to quickly respond to defects or malfunctions when they occur. The Sumitomo Electric Group has established nine service centers around the world (the United States, the United Kingdom, China, India, the Philippines, Thailand, Singapore, Brazil and Dubai) for providing prompt maintenance services and has built a framework for training maintenance staff. The staff members then provide instructions to the affiliated agents. Hiroshi Sadaki of the Production Engineering Group of Sumitomo Electric Optifrontier Co., Ltd. has long been in charge of the above-mentioned maintenance enhancement efforts.

"In the training sessions, trainees disassemble failed products, replace or adjust parts, and inspect the products to gain maintenance know-how based on a maintenance manual. Coinciding often with the launch of a new model, one person from a sales company participates in a thorough three-day program. They return to their home countries after receiving a certificate of achievement by passing a three-stage skill test. They transfer the skills that they have acquired in Japan to their respective home countries. In maintenance, it is important to swiftly determine which part is abnormal and identify the cause of the failure. Acquisition of the required expertise paves the way to developing human resources capable of swiftly providing on-site support to detected failures," says Sadaki.

Kensuke Ito
Shonan Works General Manager, Mechatronics Department, Sumitomo Electric Optifrontier Co., Ltd.

Hiroshi Sadaki
Production Engineering Group, Mechatronics Department, Sumitomo Electric Optifrontier Co., Ltd.

A sense of fulfillment in contributing to sales expansion

One of the participants in the training was Tang Chen, manager of the fusion splicer maintenance center at Sumiden Asia (Shenzhen) Co. Ltd., which also serves as a sales company in China. Tang offers guidance on maintenance to agents and repair shops across China.

Tang says, "I have participated in the training more than 10 times. The sessions are always very easy to understand. The logical explanation of the cause and effect relationship in failures helps deepen one's understanding. At first, mainly inexpensive products were sold in China. Recently, there has been a growing need for higher-value-added and higher-quality products due to the increase in data centers. I place high expectations on SumiCloud fusion splicers. Since on-site data can now be accumulated on fusion splicing, connecting this data with the system helps increase the accuracy of defect analysis and achieves more sophisticated solutions."

Yakeen Patel participated in the training from Europe. He is the manager of the UK Office service center of Sumitomo Electric Europe Limited. SEEL covers many regions: the whole of Europe, Russia, Africa, and the Middle East.

(Left) Lee Lui
Fusion splicer maintenance center, Beijing Branch, Sumiden Asia (Shenzhen) Co., Ltd.

(Right) Tang Chen
Manager of the fusion splicer maintenance center, Beijing Branch, Sumiden Asia (Shenzhen) Co., Ltd.

Yakeen Patel
Manager of the UK Office service center, Sumitomo Electric Europe Limited (SEEL)

Patel says, "We have about 70 affiliated sales agents. I am in charge of offering guidance on maintenance to agents. Every time I receive training in Japan, I am impressed by the sophisticated training programs from a professional viewpoint. It is sometimes difficult to fully understand the maintenance manual, but the practical training helps me in the acquisition of skills. Sales of fusion splicers have been growing steadily in the markets in which SEEL operates. I am confident that our maintenance service has contributed to the sales increase. There are two issues. First, SEEL operates in many non-English-speaking regions, so we want to make the maintenance manual easier to understand by translating it into other languages and using many illustrations. Second, the number of repaired units has been increasing in line with the sales growth, so we would like to increase the number of repair personnel."

COLUMN

Support for Winning a Gold Medal at the 45th WorldSkills Competition

Mr. Yuta Shimizu (center) of Kinden Corporation wears his medal as the gold medalist in the Information Network Cabling trade at the 45th WorldSkills Competition (with people from Kinden and the Sumitomo Electric Group).

The WorldSkills Competition is held every two years with the aim of promoting vocational training in participant countries and international exchange and friendships between young professionals. The Sumitomo Electric Group has provided fusion splicers critical for network cabling for the past four consecutive competitions. At the 45th WorldSkills Competition held in 2019 in Kazan, Russia, the integrated facility engineering company Kinden Corporation representing Japan won the gold medal in excellent fashion in the Information Network Cabling trade. The gold medalist, Mr. Yuta Shimizu of Kinden, told us the following:

"During the competition I encountered a series of difficult situations, placing me in a state of constant tension. However, I tackled the task until the end without giving up. When I realized I was the gold medal winner, I was filled with too much joy for words and had a sense of exhilaration. The Sumitomo Electric Group's T-400S fusion splicer and the FC-8R optical fiber cutter were so easy to use that I could demonstrate high performance during the competition. I am so grateful to those who gave me guidance, the companies that kindly supported me, and the people from the organizations involved."

Local residents lend help to B4RN broadband connection work in the United Kingdom.

MADE IN JAPAN

Fusion Splicers Supplied throughout the World

Product innovations, solutions, and global sales and maintenance networks

Global design review participated in by staff from around the world

In Japan, there are three business entities, including the Sumitomo Electric Group, that supply fusion splicers. Outside Japan, only two Korean manufacturers provide fusion splicers, excluding emerging Chinese manufacturers. The five leading companies compete fiercely with each other. The Sumitomo Electric Group is second in the world in terms of fusion splicer sales. The construction of optical fiber networks in Japan is almost complete. Overseas markets are now the main battleground. High-value-added products are supplied to the United States and Europe, while inexpensive products are supplied in the mass-market segments of China and India. Sales activities are directed mainly toward telecommunications carriers and optical fiber network installation subcontractors. Takashi Nakagawa of Sumitomo Electric U.S.A., Inc. and Yoshiaki Sakanushi of the Global Network System Division have promoted the above-mentioned sales activities.

"Sumitomo Electric is venturing into the global market with a lineup of sales companies in the United Kingdom, the United States, China, India and Southeast Asia, under which affiliated agents are arranged. The mission was to develop and implement marketing strategies and build sales-boosting mechanisms, while being deeply involved in the product planning stage. To identify market problems and needs, use these as market feedback, and make the product attractive to customers, it was necessary for development, manufacturing and sales staff to be united across borders, to share information and to collaborate with each other," says Nakagawa.

"To that end, with the aim of establishing directions for product development and sales strategies, we have invited sales managers and sales representatives from member companies of the Sumitomo Electric Group from eight countries, and have held Global Design Reviews on a semiannual basis together with engineers. This year, we set up a remote access system and held the review on a global basis in real time. Service and support meetings are also held every year to improve the staff's maintenance skills and services. The goal is to build a framework for sharing advanced repair techniques and achieving increased customer satisfaction," says Sakanushi.

in ENGLAND

Each household is connected to broadband (B4RN)

in INDIA

Stable performance ensured even in hot and dusty environments

in CHINA

Superb performance even in extremely cold locations where durability is a key requirement

Takashi Nakagawa
Sumitomo Electric U.S.A., Inc.

Yoshiaki Sakanushi
Chief Planner, Global Network System Div.

Support for B4RN, the world's fastest rural broadband

Let's hear the voice of a user that introduced fusion splicers of the Sumitomo Electric Group to the UK, in which the group's sales company operates. Broadband for Rural North Ltd ("B4RN") offers a network which is considered the world's fastest rural broadband. The network mainly covers the rural area in the northwestern part of England.

Mr. Mark Gray, who is in charge of public relations, says, "We started as a non-profit organization operated by volunteers. In the UK, the telecommunications infrastructure in rural areas was underdeveloped due to lower profitability compared to urban areas where high-speed networks were built. B4RN was established to solve social issues, such as eliminating the information gap and promoting computerization of farming."

In 2013, two years after its establishment, B4RN contacted Sumitomo Electric Europe Limited, the sales company of the Sumitomo Electric Group in Europe. David Randall, SEEL's sales manager at the time, responded to the inquiry.

Mr. Randall says, "I was inspired by the innovative idea and vision to support the local community by building information infrastructure. We supported their activities and strengthened the relationship by lending our fusion splicers free of charge for a certain period."

Why were Sumitomo Electric's products highly evaluated? Mr. Alistair Adams-Huset, who is Network Build Teams Leader and also in charge of optical fiber fusion splicing on site, points out the following:

"Sumitomo Electric's products achieve stable splicing. This is a clear advantage over our competitors' products. The northwestern part of England is humid, cold, and rainy. Sumitomo Electric's products are highly valued for ensuring robustness and air tightness, which make it possible to use the products in any environment, and to enable smooth fusion splicing. Even if problems arise, such as contamination with foreign matter, it is possible to take action and make repairs on site. This is highly helpful."

At present, B4RN has about 7,000 subscribers (users). It aims to increase the number of properties passed to c.70,000 in five to six years. To achieve this goal, B4RN places high expectations on the Sumitomo Electric Group.

Mr Gray says, "It takes a five- to six-hour drive to get to the B4RN head office from London. However, SEEL, including Mr. Randall, and Sumitomo Electric worked hard to build a close relationship with us. We would like to maintain the relationship, and we would appreciate their future support in various forms."

Pursuing the realization of dream fusion splicers

Sumitomo Electric's Lightwave Network Products Division oversees and manages the fusion splicer business. It provides technologies and products designed for connecting optical fibers by means of products such as optical connectors, fiber-optic closures and optical cables including overhead cables. Among these, the fusion splicer is the face of the division and at the core of the engineering. Yoshiyuki Suetsugu, General Manager of the Lightwave Network Products Division says that he has been pursuing realization of dream fusion splicers.

"It took shape as the SumiCloud®-equipped fusion splicer that incorporates IoT and cloud technologies. This fusion splicer enabled the remote management of progress in fiber installation work. Furthermore, "dream" fusion splicers promising no fusion splicing failure have been launched onto the market. These units incorporate NanoTune™, which enables fine tuning based on AI technology. They achieve quality fusion splices even in an adverse environment and through work done by a novice worker."

Now the question is what the fusion splicer business will aim at in the future.

Suetsugu answers, "I hope operators throughout the world use Sumitomo Electric products and realize their superb performance. We are confident that our products are superior to any other competitors' in performance, durability and ease of use. We will maintain and improve the relationships with our customers as a reliable partner, with our sales companies and service sites networking on a global scale to create innovative operation and maintenance services in line with various needs, rather than simply selling hardware as is. We desire to boost the number of our fans and expand the business in the future into the medical care and industrial fields, around the three pillars of competitive advantage: product innovation, solutions offered to respond to customer needs, and global sales and maintenance networks."

To secure the largest share of the global market, it is critically important to fulfill the challenge of creating products that meet user needs, in addition to furthering improvements in the sales and maintenance frameworks. The constantly addressed challenge is to develop a Forgiving Splicer, the point being how to lighten the workload. Meanwhile, optical fibers are also advancing, as seen with the development of optical fibers suited to fifth generation telecommunications and thin ultra-high-fiber-count cables. The Sumitomo Electric Group is working on the establishment of a fusion splicing technology adaptable to all types of optical fiber. These endeavors will bear fruit and the Sumitomo Electric Group will become a global leader of fusion splicers in the near future.

Reference: Fusion splicer-related information

Website | LinkedIn | Facebook

Mr. Mark Gray
Public Relations, Broadband for Rural North Ltd.

David Randall
Sales Manager,
Sumitomo Electric Europe Ltd.

Yoshiyuki Suetsugu
Executive Officer and General Manager,
Lightwave Network Products Div.

“Products are manufactured by people. This is why I have traveled around the world to supervise and foster workers at manufacturing sites. The key lies in listening to other people and understanding them from their perspectives on an equal footing. The repeating of this process leads to the generation of empathy and the formation of relationships of trust.”

id
Featured person

Naoko Tani

Manufacturing Engineering Department 2,
Manufacturing Engineering Management Division, Division 1,
Western Customers Group, Sumitomo Wiring Systems Ltd.

1990 Joined Sumitomo Wiring Systems Ltd.
Assigned to the Team of Trial Manufacture for Mass Production, Production Engineering Unit
1999 Made first overseas business trip (to the U.S.)
2002 Leader, Assembly Group, Manufacturing Section
2008 Chief, Assembly Team 1, Manufacturing Section
2011 Received the Taiichi Ohno Special Award, Japan Management Association (in recognition of her commitment as a supervisor in the field of manufacturing)
2013 Chief, Manufacturing Engineering Team, Manufacturing Section
2016 Production Engineering Division
Received the Excellent Safety Supervisor Award from the Minister of Health, Labor and Welfare
2020 Manufacturing Engineering Department 2, Manufacturing Engineering Management Division, and was appointed to current position

Be Positive, Happy, and Energetic! — Universally Applicable

Relationship of Mutual Trust as the Cornerstone of Manufacturing

Traveling Abroad 70 Times as a Manufacturing Supervisor

After joining Sumitomo Electric Wiring Systems, I worked as a manufacturing staff member of an assembly line in the wiring harness manufacturing division. My first turning point came when I was 27, the 10th year since I entered the company. At that time, I was enjoying my work as a line leader. I was strongly encouraged by my boss to make a business trip to the U.S. I was assigned the mission of stabilizing product quality and increasing productivity by supervising local employees’ operations and introducing improvement activities. At first, I was surprised that I had been selected for the role. At the same time, I felt greatly worried about whether I could accomplish the mission in an environment that involved a language barrier. In these circumstances, I flew to the U.S., where I repeated dialogues with local employees tenaciously to share their problems, and supervised their skills and proceeded with improvement activities in order to address the problems. I was pleased that local employees accepted me and understood my intentions. I stayed in the U.S. for only about one month, but their product quality stabilized steadily and their productivity also increased. This experience gave me great confidence and conviction that I could do well even abroad, as long as I had sufficient skills. After this business trip, I also visited plants in Thailand, China, Vietnam, Indonesia, Cambodia, the Philippines, Romania, Poland, Egypt and South Africa to supervise local employees. It was rare that my supervision was completed during only a single visit, requiring me to visit each country many times, so I have traveled abroad about 70 times so far.

While having experienced some confusion due to various countries’ differences in values and culture, I have accumulated valuable experience. I have a particularly impressive memory of a plant in Romania. The plant was messy, with many components scattered on the floor and items placed at random. I began by telling local employees to keep the worksite tidy and in order, which was the fundamental activity to raise their operational efficiency. However, I could not gain support or empathy from local employees, who claimed that they had their own way of doing things, preventing the improvement activity from spreading throughout the plant. In addition, I reduced each employee’s workload to increase their operational efficiency, causing a conflict with them because they felt that I was trying to steal jobs from them. Moreover, local employees refused to accept any direction unless it came from their plant director. So I strived to involve the plant director and emphasized to him the importance of setting a good example of clean-up, tidying up, maintenance, etc., and establishing regulations and having them observed. He understood my enthusiasm, which eventually spread among local employees, with signs of changes in their awareness and behaviors appearing gradually. From around that time, they began to accept me and other staff from Japan. (I was accompanied by six subordinates.) I went back and forth between Japan and Romania several times for two years, finally achieving my original mission of stabilizing their product quality and increasing their productivity. This experience gave me a sense of fulfillment and accomplishment.

Setting an Example to Staff, Having Them Try, and Giving Them an Experience of Success

At present, Sumitomo Wiring Systems manufactures and sells wiring harnesses in 31 countries. Striving to manufacture products of the same quality around the world, we promote Pika Pika (brilliant) Activity in all the plants. This is based on our fundamental manufacturing philosophy of “pika pika” products coming from “pika pika” mindset, behaviors, skills equipment and plant facilities. Wiring harnesses are distinctive in that they are mostly handmade, labor-intensive products. This means that each individual employee’s skills sustain their manufacturing site. Human resources are the determinant of “pika pika” products, or high-quality products. “Products are manufactured by people” — this is the fundamental point that I emphasize as a supervisor. Accordingly, it is extremely important to begin with understanding other people’s culture, values and views. The key lies in listening to other people and understanding them from their perspectives on an equal footing, without forcing Japanese styles or assuming an arrogant attitude such as “I’m an instructor!” In addition, it is also important to find an instruction method that will suit local employees and to try the method together with them. Setting an example to staff, having them try, and giving them an experience of success — this is my guiding style.

After returning from Romania, I got promoted to team chief, but I was not pleased with this career path, because I did not have confidence to fulfill my mission as team chief. Actually, the team chief’s responsibilities were quite different from my previous operations. I was required not only to improve employees’ skills and raise their operational efficiency, but also to engage in the management of human resources and costs from the perspective of a person responsible for five manufacturing lines, namely the management of the plant operations. Hard times continued, but I saw the assignment as a new exciting challenge, established a plant management method in cooperation with the assistant chief, and implemented it in my own style. As a result, I found that

Supervising local employees in Cambodia

there was no difference, regardless of my position, in the essentials — striving to ensure mutual understanding through dialogues. This made me convinced that relationships of trust based on such mutual understanding would lead to “pika pika” manufacturing.

Human Resources Directly Connected with Manufacturing

After joining the company, I continued to work in the field of manufacturing and traveled around the world as a supervisor. At present, by taking advantage of my expertise accumulated so far in the field of manufacturing, I’m in charge of the examination of wire harnesses for new car models and the preparation for their mass production. An example is designing a new production line for wire harnesses used in a new car model. I strive to contribute to achieving stable operations by identifying challenges and important points that cannot be seen on paper, and incorporating them into designs. Recently, I was engaged in the launch of a manufacturing line at a plant in the Philippines. Fostering supervisors like me is an important part of my responsibilities. My work motto is to “be positive, happy, and energetic!” I feel that this is universally applicable and constitutes the basis of work.

Sumitomo Wiring Systems is a company where products are manufactured by human resources. Fostering human resources is directly connected with manufacturing products. When looking back on my career, I find that I have been committed to HR development, leading me to emphasize the importance of understanding other people. Leaders are required to foster human resources. Those who can respect dialogue, understand other people, feature flexibility with which they can take action in any environment, and establish relationships of trust based on these qualities, can grow themselves into leaders. I hope that I will continue to foster human resources through a wide variety of opportunities, and return to the field of manufacturing in the position of manufacturing section manager or plant director. I hope that I will be responsible for a manufacturing site or plant someday and to make manufacturing plants even more exciting.

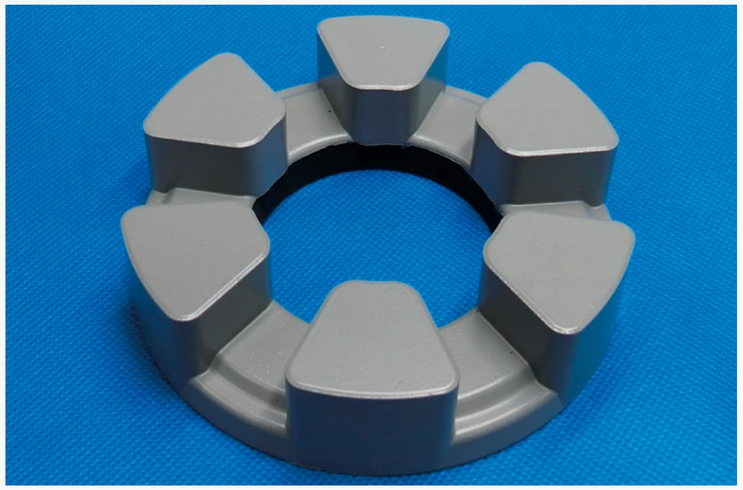
Helping to Build Thin Motors

Commencement of mass production of powder magnetic cores for axial gap motors

Axial gap motors are thinner and deliver higher power than conventional motors. Sumitomo Electric began to mass-produce powder magnetic cores as a component in axial gap motors. The powder magnetic core is a component that amplifies magnetic force. Utilizing its years of experience in metallurgy technology, Sumitomo Electric forms the core by densely compressing iron powder on a die-pressing machine into an intricate three-dimensional shape.

Sumitomo Electric's proprietary insulation coating technology has made it possible to wind copper wires directly around the powder magnetic core, reducing costs for additional components and assembly. This feature has also made it possible to expand the winding space, which helps downsize the motor and improve motor efficiency.

In recent years, automobile electrification, the performance of household electric appliances and factory automation have advanced rapidly. At the core of the drive components in these items are motors. The importance of motors has increased more than ever. Sumitomo Electric offers powder magnetic cores to contribute to the improved performance and growth of axial gap motors and axial gap motor-driven devices.



Insulation-coated powder magnetic core for axial gap motors (mass produced product)

QUARTERLY id

Sumitomo Electric Releases New Advertisement

Endeavor to realize all wishes of people around the world

An advertisement has been completed featuring Yuki Koike and Shuhei Tada, active sprint athletes at the Sumitomo Electric Athletics Club. The athletes Koike and Tada, who meet challenges on the world stage, symbolize Sumitomo Electric's enthusiastic commitment to providing the world with products and solutions that support society.

Receiving Industrial Standardization Activity Award from the Ministry of Economy, Trade and Industry of Japan

Contributing to standardization for more than 70 years

A scene from the commendation ceremony (left) and the certificate of commendation (right)

In 1949, the Industrial Standardization Act came into effect in Japan, and this has been serving as a foundation for standardization activities for industrial products. Standardization refers to activities related to the establishment of rules on product quality, dimensions and test methods, among others. Sumitomo Electric has been involved in electric wire standardization activities since before the establishment of the Act. Since then, it has continuously sent experts to technical committees, such as those dealing with electric power infrastructure—including power transmission/distribution cables, industrial wires, overhead electrical conductors and flow battery systems—and automotive/road traffic control systems, broadband telecommunications, fiber optics and industrial materials.

Moreover, in the area of superconductivity, Sumitomo Electric has served as an international secretariat for more than 30 years and has made a positive contribution to product proliferation and expansion of the market. In addition, it has often provided its personnel as International Electrotechnical Commission (IEC) council members. As exemplified by these activities, the Company is involved in standardization activities not only in Japan, but also internationally.

Sumitomo Electric has recently received the Industrial Standardization Activity Award 2020 (Commendation by the Minister of Economy, Trade and Industry) from the Ministry of Economy, Trade and Industry (METI) in recognition of its years of contribution to standardization activities, such as the establishment of international standards at the IEC and the International Organization for Standardization (ISO) and the establishment of Japanese Industrial Standards (JIS) as a foundation for industrial development and growth. The Commendation by METI is intended for individuals and organizations with distinguished achievements in industrial standardization. Sumitomo Electric will continue to contribute to market growth through the establishment of rules and endeavor to implement innovations in society by actively pursuing standardization activities in Japan and abroad.

A Picture of Sumitomo Electric in Those Days

1969

First Overseas Manufacturing Base Established in Thailand

Siam Electric Industries Co., Ltd.

The Starting Point of Our Overseas Business Expansion

In 1969, in Thailand, where there were few Japanese-based firms that had branched out, Sumitomo Electric founded Siam Electric Industries Co., Ltd. as its first overseas manufacturing site. As a factory manufacturing general-purpose magnet wires, Siam Electric began to support the overseas business expansion of Sumitomo Electric's customers in the early days, has continued to operate its magnet-wire business, and marked its 50th anniversary in 2019. Presently, having been renamed WIN-T,* the company supplies magnet wires as before, with comparable quality to those provided in Japan, mainly to Thai production sites of Sumitomo Electric's customers.

Since the establishment of its overseas manufacturing site in 1969 in Thailand, the Sumitomo Electric Group has promoted its overseas business expansion, understanding the market characteristics and needs in individual business fields. Sumitomo Electric has made inroads in many parts of the world, and the Group creates jobs and trains people, while ensuring that production sites take root in local communities. Sumitomo Electric today conducts business on a global scale, as a business group with consolidated subsidiaries numbering 416 and with more than 280,000 employees.

*WIN-T:Sumitomo Electric Wintec (Thailand) Co., Ltd.

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Information and videos not posted in this magazine are found on the "id" special site
https://global-sei.com/id/

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