

A Picture of Sumitomo Electric in Those Days

1923

The Great Kanto Earthquake



The building housing our Tokyo sales office at the time nearly escaped the fire

Offering Electric Wire and Cable at Pre-Earthquake Prices

—The Spirit of Fusu-furi, of Never Pursuing Easy Gains

On September 1, 1923, a massive earthquake with a magnitude of 7.9 hit the Kanto region, inflicting devastating damage on many facilities and equipment critical to communications and transportation, and affecting many businesses. Restoration from the disaster was extremely difficult. Amidst the situation, Sumitomo Electric Wire & Cable Works^{*1} was one of the few manufacturers that could supply electric wire and cable, which were essential for reconstruction.

Five days after the earthquake struck, staff members of Sumitomo Electric Wire & Cable Works visited the Ministry of Communications, Ministry of Railways, Tokyo Electric Light, and others to identify what they needed most urgently. Although the staffers were inquired product prices, no precedent existed on which they could set prices for electric wire and related products because the markets for

copper, zinc and some other materials used for manufacturing the products were closed. Moreover, as indicated by the issuance of the anti-profiteering act,^{*2} general prices were also appreciating in the disaster's ensuing chaos. Nevertheless, believing that the first priority should be on reconstruction, the company decided to deliver their products basically at prices set before the earthquake. Further, to shorten delivery time, they worked round the clock. They continued to receive a rush of orders, but did not raise prices, instead making all-out efforts to contribute to the reconstruction, thus fulfilling their societal responsibility.

Behind this was the spirit of Fusu-furi, of always attaching importance on the public interest and prohibiting the pursuit of easy gains. Since Sumitomo's establishment, the Sumitomo Spirit has been passed down continuously to the present day.

^{*1}: Present-day Sumitomo Electric ^{*2}: Ordinance established to control cornering and holding back items

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vol. 04

Innovative Development,
Imagination for the Dream,
Identity & Diversity

Feature

The Future of a
“Water Planet”

Created with Water Processing Technology

SUMITOMO
ELECTRIC
GROUP

The Earth viewed from space is often referred to as the “Water Planet.” However, most of water on the Earth is seawater containing salt, which accounts for about 97% of all of the water resources. Most of the rest, or fresh water, is in the form of snow/ice and glaciers and most groundwater is deep under the ground. When it comes to fresh water that is usable by humans, this makes up only 0.01% of all of the water resources on the Earth*. Preservation of these precious water resources is a great challenge for humans. Furthermore, due to various factors, such as global population increase, the growth of emerging economies, and climate change, the world is facing an increasingly serious water shortage. Under these circumstances, it is essential to effectively use water resources. To be specific, it is required to introduce and evolve water treatment technology to purify and reuse water once polluted. At the beginning of 2000, the Sumitomo Electric Group successfully developed epoch-making water treatment membrane modules to help solve the social problem of global water shortage and thus newly entered the water treatment industry. Ever since, those modules have been introduced to water treatment facilities not only in Japan but also in East Asia and North America and earned a high reputation. This feature article explains the project to introduce the modules to the water treatment facilities of a petroleum refinery company in Taiwan, which was a key milestone and triggered the cultivation of a wider water treatment market, as well as our initiatives to establish a manufacturing site of the Sumitomo Electric Group in China. The passion and aspirations of the Sumitomo Electric Group employees there will lead efforts to solving the global water shortage problem and conserving the environment of the “Water Planet” Earth.

* Source: Ministry of Land, Infrastructure, Transport and Tourism “Responding to International Water Resource Problems”

Projects **id** Formidable Social Challenges

“Water Planet” Increasingly Suffering Water Shortage

—Preserve the Limited Water Resources—

Coastal industrial complex of Kaohsiung, Taiwan's largest industrial city, viewed from the mouth of the Gaoping River flowing in Southern Taiwan

Started our activities to use high-performance porous materials for water treatment

The Sumitomo Electric Group developed epoch-making water treatment membrane modules. Before explaining about the modules, it is necessary to refer to the details of water treatment. There are several water treatment methods. Among them, the so-called membrane bioreactor (MBR) method has been attracting considerable attention in recent years. This is one of the “active sludge methods,” which are considered effective for sewage and industrial wastewater treatment. In this treatment, wastewater is degraded and treated by microorganisms (active sludge), and then organic matter and fine particles are separated from the water using filtration membranes (hereinafter referred to as “membranes”).

Not only turbidity but also dissolved organic matter can be removed, allowing the discharge of the water to rivers, which is regulated by strict standards, as well as the reuse of the water. The membranes used for this MBR are POREFLON™ hollow fiber membranes. These membranes have a material separation function because they are made of tubes of about 2 mm in outer diameter with a microscopic porous structure. POREFLON™ is a porous material developed by Sumitomo Electric and made of 100% polytetrafluoroethylene (PTFE) resin. With attention focused on the various excellent characteristics of POREFLON™ developed in the 1960s, such as high chemical resistance, high durability, high water permeability, and high heat resistance, hollow fiber membranes suitable for water treatment were developed. Toru Morita, General Manager of the Water Processing Div. successfully put the membranes into commercial use. “Conventionally, materials such as polyethylene (PE) were used for hollow fiber membranes but problems with durability and chemical resistance were pointed out. We focused our attention on POREFLON™ that uses PTFE to solve these problems. We were convinced that competitiveness would be adequately enhanced by promoting price reduction through refining product design and manufacturing technology and started our activities to



Toru Morita
Manager, Water Processing Div.,
Sumitomo Electric



Purify Wastewater from a Large-scale Oil Refinery in a Water Shortage Area –CPC Corporation Wastewater Purification Project in Taiwan–

MBR tank of CPC viewed from above. POREFLON™ modules for water treatment are laid out in layers.



POREFLON™ modules installed in MBR

commercialize POREFLON™ modules for water treatment use.”

Started a big project under tough business circumstances

The development of POREFLON™ modules was started as stated above and successfully completed in 2003 following the production of a number of prototypes and mass-production was started in China in 2004. However, this was the beginning of facing severe difficulties. Soon after the start of the production, significantly

negative reactions to POREFLON™ modules were received from markets both domestic and abroad. The key complaint was the extremely high price of the PTFE material. It was when withdrawal from the market was considered that Morita met an agent handling industrial materials in Korea and obtained information on the water treatment market in Korea. Morita and other members, who recognized the potential of the high water treatment performance of POREFLON™ modules, cooperated with the agent that was enthusiastic about sales of the modules and promoted sales activities in Korea and finally introduced the modules to a sewage treatment plant. However, the sales of the modules were down again due to the change in the market environment. In order to break through such a situation, Morita and his team focused on the needs for water treatment in East Asia as well as in Japan and steadily continued proposal activities of POREFLON™ modules. Consequently, a big project was triggered by a certain meeting. Generally speaking, an engineering company contracted for the construction of water treatment facilities has the right to decide on the introduction of membranes to the facilities. Therefore, an approach to such a company is a key to

promote the sales of POREFLON™ modules. In 2008, Morita's team displayed POREFLON™ modules at a water treatment exhibition held in Guangzhou, China. There, they met CTCI Corporation, one of the most prominent engineering companies in Taiwan.

Built a strong relationship of trust with the engineering company

In Taiwan, even though POREFLON™ modules were being gradually adopted mainly for the use in water treatment facilities of the factories of electronic products, membranes provided by major US companies were dominant in the water treatment market in Taiwan and we were not really in a favorable situation. Morita was trying to

participate in a project that could make an impact on the market and show our presence. Meanwhile, CTCI had experience of constructing a plant for CPC Corporation, Taiwan, a major oil refinery company in the country, and was conducting a study on membranes to be adopted for the water treatment facilities newly introduced by CPC at that time. In addition, since the southern part of Taiwan, where CPC is located, was suffering a chronic water shortage, the public administration regulated water discharge and made it compulsory particularly for companies that discharge a large amount of industrial wastewater to reuse the water. Under such circumstances, POREFLON™ caught the attention of the staff of CTCI in the exhibition. At that point of time, CTCI had already



Morita (right) and Jeff (left) checking the condition of POREFLON™ modules

The Future of a “Water Planet” Created with Water Processing Technology



Jeff Zhang
Taiwan branch of Sumitomo
Electric Interconnect
Products (Hong Kong), Ltd.

started design on condition that it would use competitor's membranes. However, Jeff Zhang of the Taiwan branch of Sumitomo Electric Interconnect Products (Hong Kong), Ltd. strongly approached CTCI to reconsider the decision.

“I strongly stressed the advantages of POREFLON™. The CTCI staff highly evaluated the characteristics that show strength in treating wastewater containing oil and mineralized wastewater. We also focused on building a strong relationship of trust with the relevant staff. These efforts made it possible to start a pilot test.”

Started a pilot test Initiatives to solve the problem

A pilot test was started in 2009. However, a problem arose. A hollow fiber membrane has a number of fine pores to enable fine filtration, but clogging occurred due to the oil contained in the wastewater and consequently the purification performance decreased. The pilot test faced a difficulty. To solve the problem, two different approaches were taken. First, a thorough study was conducted on the fine structure of the membrane unlikely to cause clogging and the mechanism causing oil clogging was investigated to optimize the pore diameter for stable operation. Then the membranes were cleaned using strong chemicals to remove matter adhering to the surface. The cleaning was carried out using high-concentration acids and alkalis, which was possible only for POREFLON™ because of its high chemical resistance. Jeff, who was in charge of sales, also engaged in cleaning membranes at the site and recognized anew the high performance of the product of his own company. “We did what we had to do and obtained results. I believe that the repetition of this cycle impressed CTCI.” The pilot test lasted for about one year, and CTCI valued the good results in cleaning performance obtained in the treatment of oil-contaminated wastewater and durability and flow rate restoration after the cleaning of membranes with acids and alkalis, and finally decided to adopt POREFLON™ modules.

Mission Imposed on Sumitomo Electric —Presence of POREFLON™ Increased—



Evening view of CPC water treatment facilities. Water is treated without a break.

Applause on receiving an order and making a breakthrough in the water treatment market in Taiwan

CTCI decided to use POREFLON™. But this did not necessarily mean that CPC decided to introduce water treatment facilities because a track record was important for a large-scale project. No proven track record was available for POREFLON™ modules. It was only the data in the pilot test that was available. There was a further obstacle. At that point of time, the end-user, CPC, had already



Hiromu Tanaka, Sumi-Pac Corp.

adopted specifications based on the membranes of a major U.S. company. To clear this obstacle, we contacted a doctoral research fellow who had authority to make a decision on membranes. The data in the pilot test was presented to stress the advantage of the characteristics of POREFLON™. “Our fulfillment of the specifications made it possible to bid on the project.” (Jeff, aforementioned) In the summer of 2012, the receipt of order was confirmed as a result of the bid, which was followed by a whoop of delight by Zhang, who had worked hard at the frontline, and all of the staff. Winning the bid against a major U.S. company meant a big breakthrough in the water treatment market in Taiwan. In addition, receiving an order for a project of highly challenging treatment of industrial wastewater containing oil of as much as 6,000 m³ per day could be a high-level actual achievement, which boosted subsequent sales expansion activities. This was an epoch-making large order receipt for the Sumitomo Electric Group water treatment business.

“Customer-oriented stance” ensuring good purification performance over the long term

Trial operation started in the latter half of 2013. In this period, Hiromu Tanaka of Sumi-Pac Corp. in the Sumitomo Electric Group, who was in charge of membrane operation technology, entered the construction site together with Jeff. Jeff and Tanaka stayed at the construction site of CTCI for about three weeks and demonstrated normal operation. Finally, in January 2014, the water



Mr. Shun Fa Huang, Executive Manager, Petrochemical Business Div., CPC Corporation, Taiwan

treatment facilities started full-fledged operation. What is essential for operation is to “maintain the condition of membranes as close to that of new ones as possible,” which is a key point to maintain the purification performance. Required for this purpose are periodic maintenance and chemical cleaning. However, a problem occurred about five months after starting stable operation. Clogging of membranes occurred as it did during the pilot test.

“The problem occurred because the maintenance method had not been shared with the operators of



Mr. Kuen-Song Pan, Head of Sulfolane Unit, CPC Corporation, Taiwan



POREFLON™ modules purifying wastewater. Particularly effective for water treatment at petrochemical plants.



POREFLON™ modules being cleaned during maintenance

CPC appropriately. We cleaned the membranes to restore their condition close to that of new ones and showed the cleaning method in accordance with the operation manual. We tried our best to obtain customers' understanding and satisfaction” (Tanaka).

Thereafter, we paid periodic visits to the site. We continued to provide technical follow up also for cleaning and consequently stable operation was achieved.

Cleaning maintenance business properly meeting the customer's needs

The water treatment facilities that adopted POREFLON™ modules have been operating stably to date but the treatment performance was gradually decreasing due to dirt accumulated on the surface of the membranes during the four years after starting operation. Even though periodic cleaning has been performed, it makes a difference what kind of chemicals are used. POREFLON™ can stand strong acid chemicals. However, it was difficult to use such chemicals for the facilities of CPC, which were designed in accordance with the the major U.S. company's standard. In other words, one of the factors that decreased the treatment performance due to clogging was the fact that only mild acid chemicals could be used for cleaning due to the limitations of the facilities of CPC. Accordingly, we started up a new maintenance business in 2017 whereby membranes were cleaned by strong acid chemicals outside of the facilities. Referring to the series of these initiatives, Mr. Shun Fa Huang, Executive Manager, Petrochemical Business Div. of CPC said, “We want to reuse all of the wastewater to help solve the water shortage problem. In response, the Sumitomo Electric Group not only provides us with high-performance membrane modules but also various

services, such as cleaning and wastewater analysis. We hope that the Sumitomo Electric Group continues provide their perfect maintenance supports and make further cost reduction efforts.”

Mr. Kuen-Song Pan, Head of Sulfolane Unit, and Mr. Detsai Wen, Engineer, also unanimously said, “We rely upon and place expectations on the capability and expertise of the Sumitomo Electric Group.” After steadily receiving high evaluations, at the end of 2017, additional orders were received for membrane modules in response to the increase in the amount of wastewater treated by CPC. We also received an inquiry for a new project at another plant of CPC.

Took on a challenge again toward a big new project Leap from the business of stand-alone POREFLON™ modules

The Sumitomo Electric Group announced the technical achievements and results accumulated at CPC in the conference of a water treatment-related academic association in North America. An inquiry was received on this occasion and subsequently orders were received from oil refinery and food-processing companies in the U.S. Modules were delivered to them and finally POREFLON™ modules successfully entered the U.S. market. Furthermore, a project to introduce our modules to large-scale sewage treatment facilities is ongoing also in Taiwan backed by our achievements at CPC. As done during the period of introduction to CPC, pilot tests are being performed at several sites. The sales expansion strategy is also entering a new phase.

“Conventionally, our business was marketing stand-alone POREFLON™ modules. In the future, however, in order to further expand our business, it is important to access the final market where product features can be fully exploited as well as build a proactive business model. We will develop our business by narrowing down regions and providing total system and service solutions with membrane modules incorporated into them. We will promote our business at a higher level.” (Morita, aforementioned)

Our water treatment business in Taiwan is sure to make a significant leap forward triggered by the CPC project.



Mr. Detsai Wen, Engineer, CPC Corporation, Taiwan



Skilled employees working diligently

Taking on the Challenge of Cultivating the Gigantic Chinese Market

—The Core of Sumitomo Electric’s Water Treatment Technology, Zhongshan in China—

The production base of POREFLON™ modules has survived a tough period

POREFLON™ modules, the sales of which are expected to expand, are exclusively produced at Zhongshan Sumiden Hybrid Products Co., Ltd. (ZSH) in Zhongshan in Guangdong Province, China. ZSH is about 1.5 hours by sea from Hong Kong and about 1.5 hours by car from Shenzhen or Guangzhou. ZSH was established in 1995 and started operations to produce fluorine resin-related products. The production of POREFLON™ modules



Jinyu Zhao, Director of Manufacturing Dept. ZSH

started in 2004. It was in 2006 when the commercial production system of POREFLON™ modules was completed in response to the introduction of the modules to sewage treatment plants in Korea; however, it was extremely difficult to maintain this system. Jinyu Zhao, Director of Manufacturing Dept., who has been involved in the operation from the initial stage says, “We were in a situation where the factory could not continue its operations unless POREFLON™ modules could be sold, and this tough situation continued for some time. The unstable production volume led to a low employee retention rate and it took a long time for the factory to achieve its current commercial production style.” To overcome this situation, marketing activities in China have been strongly promoted since the start of production.

Our motivation to cultivate the market backed by our confidence that our membranes are revolutionary

Sales and marketing activities in

the Chinese market are conducted mainly by Sumiden Asia (Shenzhen) Co., Ltd. (SEAC), which sells a variety of products such as electric power-related products, information and communication equipment, and semiconductors. POREFLON™ modules are also handled and Ziyu Wang of the Beijing Branch of SEAC is one of the staff in charge of the modules. Wang studied engineering at university and first encountered POREFLON™ modules when he was engaged in design work for water treatment membranes.

“Revolutionary. That was my impression. I was convinced that this



Yoshitaka Ikeda, General Manager (center), Shinsuke Kawabe, Manufacturing Div. (right), and Kenji Ihara, Manufacturing Div. (left) of ZSH



View of the factory of ZSH, a major manufacturing factory of POREFLON™ modules



Top-Bottom) Hollow fiber membrane processing equipment operating in the factory



membrane would contribute to solving various environmental problems, notably including water shortages, in China. I wanted to expand the use of POREFLON™ in the Chinese market myself and decided to join SEAC.”

Mr. Wang is in charge of the entire Chinese market. The targets include end users in various fields such as the dyeing industry, final disposal sites (waste disposal sites), and public sewerage systems. He focuses on marketing activities for public sewage use with high needs particularly in rural areas. From users who had actually introduced the membranes, “an overwhelmingly high evaluation was obtained” (Wang). He says that he would continue to properly and promptly find customers’ needs and issues of concern, thus aiming to further increase market share in the future.

The passion of partners for sales expansion marking a new chapter in history

In addition to SEAC, the key to

success in cultivating the Chinese market is “partners for sales expansion.” Among them is Mr. Canhui Song, General Manager of our sales agent, Suke Environmental Technology Co., Ltd. He majored in environmental engineering at university and subsequently took a water treatment-related job, where he encountered POREFLON™ modules as a customer.

“We tested the actual equipment and found that the energy consumption was low and the modules had high mechanical strength and a long life. They were stain-resistant with a high water permeate flow. I was surprised at their high performance compared to existing membranes. I was convinced that the membranes would bring about innovation in water treatment.”

With the aspiration of contributing to “improving the water environment in China,” Mr. Song established a sales agency for the purpose of expanding the use of POREFLON™ modules in the Chinese market. At the initial stage, however, the reaction from the market was weak. With a belief that the modules would eventually be acknowledged, Mr. Song made an all-out effort to cultivate the market and POREFLON™ modules have been rapidly penetrating the Chinese

Mr. Canhui Song

General Manager,
Suke Environmental
Protection Technology
Co., Ltd.



market since 2015 without losing momentum. “I love Sumitomo Electric’s membranes as much as my wife,” says Mr. Song. He is devoting himself to his sales activities not by trying to sell membranes but by trying to solve customers’ problems.” It is Jian Li of the Shanghai Branch of SEAC who acts as a bridge between partners for sales expansion like Mr. Song and the Sumitomo Electric Group.

“My role is to coordinate between the needs of the partner and our company for sales expansion and share information to develop a system to face the market in a mutual way



Ziyu Wang, Beijing Branch, Sumiden Asia (Shenzhen) Co., Ltd.



Jian Li, Shanghai Branch, Sumiden Asia (Shenzhen) Co., Ltd.



Hidenao Shima, Group leader, Sales Dept., Water Processing Div., Sumitomo Electric

with the same stance. The purpose is not merely to create profits but also to create a new history—the environmental conservation business—in the Sumitomo Electric Group. I believe that it is our mission to develop the water treatment business into a new chapter of our history.”

Initiatives to reduce the production cost and raise employees’ awareness

Since 2015, POREFLON™ modules have rapidly penetrated the Chinese market. This is attributable partly to the outcome of the sales efforts but most significantly to the progress in cost reduction. It was Hidenao Shima, of the Sales Dept., Water Processing Div., Sumitomo Electric, who was commissioned first to cultivate the Chinese market, where the business was weak, with an eye to global business development of POREFLON™ modules.

“Good quality products do not necessarily sell well in China. When I took up my new post in China, membranes significantly less expensive than POREFLON™ were dominant in the Chinese market. Price competitiveness was the key to success in cultivating the Chinese market.”

Shima strongly requested the manufacturing staff of ZSH to reduce the production cost. This request was received by Shinsuke Kawabe and Kenji Ihara, of the manufacturing group. They were engineers who had entered Sumitomo Electric as production engineering specialists.

“We took various measures such as a review of the materials, improvement of the yield rate, and improvement of the work efficiency at the production site. However, the most important matter for promoting improvement was to create an environment where employees at the production site could work with high motivation. So we set targets and enhanced the motivation of individual employees” (Kawabe). “We established a system whereby all members proactively participated in the project and we successfully raised individual employees’ awareness of eliminating waste and unreasonable activities” (Ihara).

Consequently, the production cost could be significantly reduced and price competitiveness could be ensured. Finally, we could achieve a robust annual sales increase of about 50% in the Chinese market, starting in 2015.

Aiming to Solve Water Treatment Issues throughout the World

—From Asia to the World, the Beginning of a New Challenge—

Expansion and evolution of production bases with an eye to labor saving and efficiency improvement

The capacity of the production base, ZSH, is being increased more than 1.5 times the conventional level to meet the significantly growing demand associated with increasingly stringent environmental regulations in China. The new factory is planned to start operations in May 2018. With the sales expansion of POREFLON™ modules in the market, ZSH is also facing a new phase. ZSH will endeavor to further reduce the cost as there is “no end to the pursuit of cost reduction.”

“The first thing to do is to introduce the latest facilities that can achieve more efficient production. Due to a continued labor shortage in China, it is necessary to promote labor saving and efficiency improvement. The other thing to do is to provide training. I believe that, by enhancing the skill level and increasing the number of multifunctional workers, a high-quality and more efficient production system can be established even with fewer workers” (Zhao).

In addition, with the progress in sales expansion, the number of models being produced is also increasing.

“We have already started our efforts to maintain the stability of the operation, despite the increase in the number of models. In addition,



POREFLON™ modules lined up to be shipped from here to worldwide destinations

even though we are engaged in manufacturing, we will actively promote our activities outside the factory in the future, such as supporting sales and providing technical assistance by paying visits to customers” (Kawabe).

Steadily expanding our share of the Chinese market to make Sumitomo Electric's membranes commonly known in China

Kiyoshi Ida, General manager of the

Sales Dept., Water Processing Div., who has developed the POREFLON™ module and led the water treatment business together with Morita, points out that the market scale will surely expand in the future because environmental regulations in China are becoming increasingly stringent. Kiyoshi Ida says that, as the competition becomes more intensive, it will become more important not only to pursue further cost reduction to maintain our price competitiveness but also consider how to make our product



Engineering staff thoroughly checking a completed POREFLON™ module

The Future of a “Water Planet” Created with Water Processing Technology

A wide range of POREFLON™ modules usable at various water treatment facilities



as Thailand, Vietnam, and Indonesia, are introducing more stringent regulations and values for effluent water quality, which provides a great business opportunity for membrane manufacturers. We will implement the strategy of detecting the trend of water treatment needs on a timely basis and also building partnership relationships to ensure the receipt of orders, thus actively cultivating new markets.

Morita says, “It is important not only to establish a revenue base but also have an awareness that the water treatment business in which we engage is an activity conscious of ESG investment (sustainable growth indicator from the three perspectives of Environment, Social, and Governance).” “Membranes provided by us are extremely effective in preserving water resources on the Earth. Supplying POREFLON™ modules to water treatment sites around the world means nothing else than contributing to solving the social problem of the global water shortage. Based on this belief, we will deliver POREFLON™ modules worldwide.”

With a mission to preserve global water resources, “Sumitomo Electric's membranes” will be rolled out to markets across the world from Asia to North America, the Middle East, and Africa – just the beginning of a long journey.

Kiyoshi Ida
General Manager,
Sales Dept.,
Water Processing Div.,
Sumitomo Electric



selected by customers.

“It is important to have customers recognize the strength of POREFLON™ modules, i.e., stability and durability in water treatment, and also the economic advantage brought about by this strength, thus enhancing customers' buying motivation. It is essential to deal with companies and associations on an individual basis or fulfill the specifications for each type of business and industry. It is important to take action earlier than our competitors and I believe that there is certainly a first-mover advantage gained by earlier action.”

POREFLON™ modules are steadily increasing their market share in the area of leachate treatment at final disposal sites. Our target is to obtain a high market share also in other areas and make Sumitomo Electric's membranes commonly known in the wastewater treatment industry in China.

“Sumitomo Electric's membranes” rolled out worldwide with our aspiration to conserve the global environment

The water treatment business of the Sumitomo Electric Group, with the Chinese market strategy positioned at its core, is already eyeing the world market. In this case, the fact that the Sumitomo Electric Group already has business bases in many countries around the world is one of its great advantages, with many footholds to start sales activities.

“I believe that it is important to follow the government environmental policies of each country, such as strengthening environmental regulations and securing water resources, to proceed with our activities, which will ensure our entry into the respective markets” (Ida).

Following East Asia, we are targeting Southeast Asia, as well as North America, to expand our sales. Now, various Southeast Asian countries with significant economic growth, such



Vigorous discussion on how to implement the market strategy in a marketing meeting

He Shihong

Vice General Manager, Tianjin Jin-Zhu Wiring Systems Co., Ltd. General Manager, Huizhou Jin Hui Wiring Systems Co., Ltd.

1994: Joined Tianjin Jin-Zhu Wiring Systems Co., Ltd.

2003: Vice Manager, Financial Management Division

2006: Manager, Corporate Management Department

2007: Vice General Manager

2014: Certified as a SEI Group Global Executive*

2015: General Manager, Huizhou Jin Hui Wiring Systems Co., Ltd. (concurrent)

*At Sumitomo Electric, we annually select Group Global Executives, personnel who are expected to exceed in business operations not only for their companies but also for the entire Sumitomo Electric Group on a global basis, from among the management of our overseas group companies. He has been selected in succession since this system was established in 2014.

Creating Teamwork Based on the Sumitomo Spirit

“It’s necessary to create an environment where staff members can enjoy working comfortably. Such an environment will enhance the staff’s motivation, which leads to increased productivity and quality. These findings were the starting point of my career as a manager.”



Challenge of exploring a new career Considering what to do and implementing it thoroughly

After graduating from university, I joined a car manufacturer in Tianjin and engaged in automobile design. My first turning point came in 1994, when Tianjin Jin-Zhu Wiring Systems Co., Ltd. (TJWS) was jointly established by the car manufacturer, Sumitomo Electric, and Sumitomo Electric Wiring Systems. TJWS manufactures automotive wiring harnesses and supplies them mainly with Japanese-affiliated car manufacturers. I obtained the challenging opportunity of participating in a project toward the establishment of the new company.

Although having pursued a career as an engineer until that time, I was strongly attracted to working as a manager, as someone who leads problems to solutions by communicating with many people, and who enhances corporate value and staff satisfaction. At the same time, I was convinced that my logical thinking as an engineer, creating new things by identifying the essence of problems through accumulated expertise and deep insight, would be useful in working as a manager. However, every day was a succession of difficulties until the company was established. Learning the necessary procedure from scratch by myself, I accumulated various knowledge and know-how.

Five years after the new company's establishment, when I was in charge of financial affairs, a big problem occurred. One of our customers launched mass-production of a new car model, followed by the start of our shipment to the company. Nevertheless, our price negotiation did not reach an agreement, preventing us from recovering our invested capital. We were forced into an extremely difficult financial situation. Being in charge of financial affairs, I thoroughly managed a financial plan and the needed financing on a daily basis, while applying for bank loans, negotiating with the customer on recovering the invested capital, and coordinating with the parent company. I was literally running around everywhere every day. Eventually, our company was able to overcome the big crisis. Facing the difficulty, I considered what I needed



Together with JHWS staff making concerted efforts for the reforms

Management for Generating Optimal Solutions

to do for the company at that time and implemented it thoroughly, making me strongly realize that every problem can be led to a solution.

Creating an energetic environment where staff members can enjoy working That's my mission as a manager

Over the years, new positions were given to me, accompanied by expansion in my career field as a manager. When I was promoted to Vice Manager of the Financial Management Division, I ran into a large wall. As a manager, I was working with the belief that appropriate directions and decisions were inevitable for subordinates. However, this attitude was insufficient to generate the results I expected. “What can I give to my subordinates?” “What’s wrong with me?” “What’s the meaning of my existence?” I continued asking myself every day. The answer that I discovered was that my role was to create an environment where staff members could enjoy working comfortably and energetically. I began to change myself, starting with my facial expression and response style. I also ensured closer communication, thus striving to know more about the reality of the work of various sections and the thoughts and feelings of staffers working there. If I found any problem, I try to solve it. It’s necessary to create an environment where staff can support and help one another and that makes staff members feel like going to work every day. Such an environment will enhance the staffers’ motivation, which will lead to increased productivity and quality. These findings were the starting point of my career as a manager.

Teamwork with heart-to-heart connection is driving force to revitalize the company

In 2015, I was appointed as General Manager of Huizhou Jin Hui Wiring Systems Co., Ltd. (JHWS), established in 2000 jointly by TJWS and an automotive component manufacturer in Guangzhou. JHWS was suffering from ongoing sluggish performance. In that environment, I was entrusted with turning around the company.

I first set numerical targets, and advanced the necessary reforms to accomplish the targets. Outside the company, I actively engaged in negotiations with customers to receive their orders, while implementing a wide variety of efforts inside the company such as spreading new principles among staffers with long-term careers and gaining their understanding, reviewing various evaluation systems and regulations, and upgrading facilities and equipment. The most critical element was ensuring unity



Ensuring communication every day with staffers at work

among the staff. When they became aware that they were the key players in revitalizing their company, teamwork toward achieving the targets began being generated.

This awareness was fostered based on the Sumitomo Spirit, consisting of Banji-nissei*1, Shinyo-kakujitsu*2, and Fusu-furi*3. Believing that these tenets had affinity for Chinese culture, I provided opportunities for all the staff members to understand and recognize them, for example, by reflecting the Sumitomo Spirit into their own work at introductory training programs for new employees, daily morning sessions, and regular training programs. Their common awareness of the tenets generated a sense of unity among the staff, changing their attitude toward work. Consequently, the company was placed on a track to recovery. After a breeding ground for success was prepared, I focused on listening to each staff person, and made all-out efforts to establish a relationship of trust and to ensure that the evaluation was performed fairly and equitably. As a result, the company moved into the black two years after my appointment. This was not achieved by me alone, but by every staff member making concerted efforts. All of us at JHWS shared the joy of revitalizing the company.

In the future, I would like to make the utmost contributions to Sumitomo Electric Group’s business development, by increasing our sales of wiring harnesses not only for Japanese-affiliated manufacturers, but also for those in China, Europe, and the U.S., and by expanding our production scale. To this end, I strive to create a corporate environment where staff members can feel more joy in working than ever and realize their growth. As a SEI Group Global Executive, I believe in two requirements of leaders: to consider what to do and then implement it fully; and to ensure heart-to-heart communication from staff members’ perspectives. By doing these, management for generating optimal solutions can be realized.

*1 Banji-nissei: Do your sincere best, not only in business but also in every aspect of your life.

*2 Shinyo-kakujitsu: Place importance on integrity and sound management.

*3 Fusu-furi: Do not act rashly or carelessly in pursuit of easy gains.

Development of Magnesium Alloy That Contributes to Reducing Vehicle Weight



Magnesium Alloy Sheet

Magnesium alloy is the lightest among structural metals. Its specific gravity is about a quarter of that of steel and two thirds of aluminum. Magnesium alloy is recently receiving considerable attention for use as a structural material by taking advantage of its light weight because its disadvantages, such as being “easy to break and hard to process,” “prone to corrosion,” and “easy to burn,” have been overcome. The magnesium alloy most widely used now in the world is “AZ91.” This is a material with aluminum and zinc added in amounts of about 9% and 1%, respectively, to increase mechanical strength and enhance corrosion resistance. Sumitomo Electric was the first to successfully develop AZ91 plate metal that can be cut and bent as well as pressed to form the desired shape and started the commercial production of notebook PC chassis using AZ91 plate metal in 2012. Now, we are endeavoring to use this material not only for electronics-related products but also in the automotive, railroad, and aircraft industries, where the weight of components needs to be reduced.

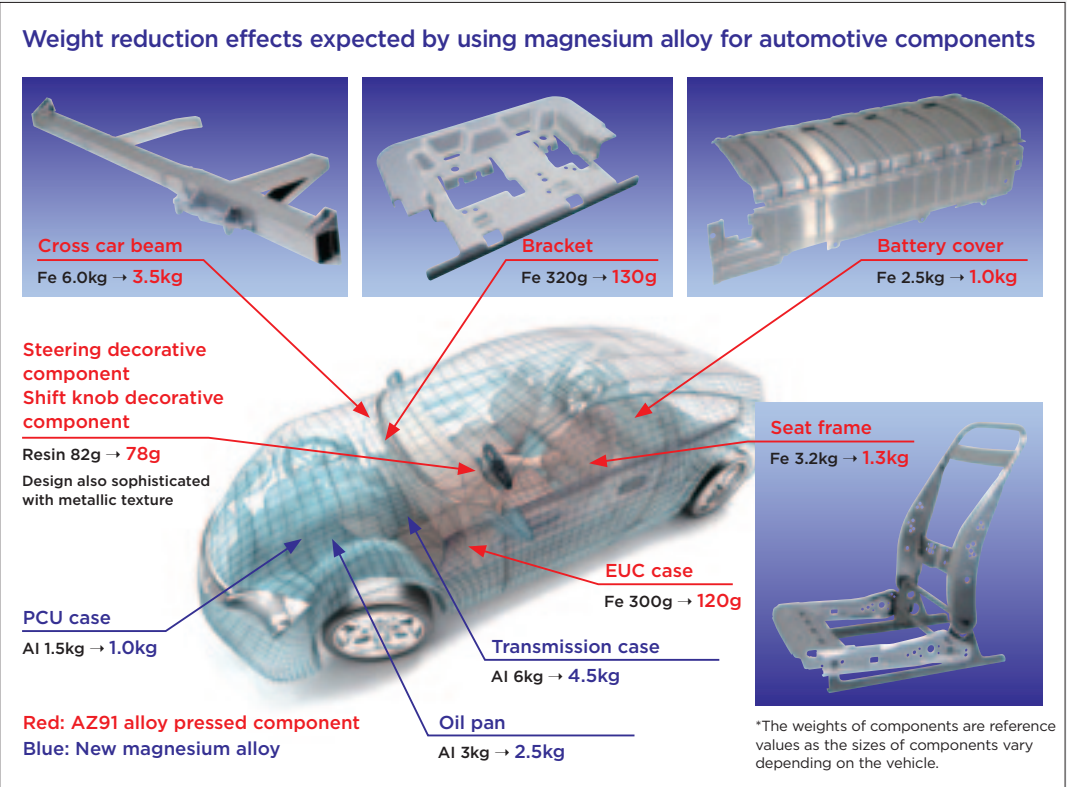
In addition, in November 2017, jointly with the University of Toyama, we successfully developed a new magnesium alloy for die casting* by

significantly improving the heat-resistance characteristics, one of the weak points of magnesium. The outstanding features of this new alloy include superior heat resistance, which makes it possible to be used as engine component materials, and high cost efficiency and low environmental impact as it is free of expensive rare-earth elements and recyclable. These advantages allow the use of this magnesium alloy for large-sized die cast components near engines, power trains, and motors, for which it was difficult to use conventional magnesium alloys, and consequently this new magnesium alloy is expected to significantly contribute to reducing vehicle weight.

*A casting process in which a molten metal is injected into a die under high pressure and cooled and solidified. Thanks to its high productivity, die casting is widely used for manufacturing aluminum automotive components.



Magnesium alloy ingots for die casting

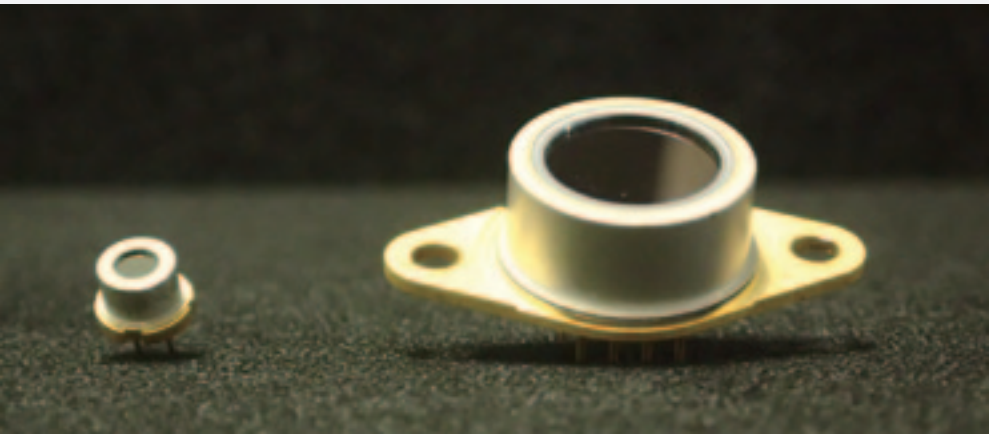


Development of QCL Module, the World's Smallest Laser Light Source for Sensing

For the purpose of conserving the environment and ensuring security and safety, air pollution gases and greenhouse gases are required to be measured with high sensitivity in real time. In this context, laser gas sensing, which uses a laser light source to measure trace amounts of gases, is attracting public attention.

Sumitomo Electric has successfully developed a QCL* module, a laser light source for sensing, by incorporating its original light-emission structure and using its semiconductor device technology accumulated over many years.

As this module can achieve sufficient light output with low power consumption and low heat emission, it does not require a large and expensive heat dissipation package. This module can also detect gases with high sensitivity in a temperature environment higher than that for



QCL CAN module (Left: without built-in thermoelectric cooler (Φ5.6 mm), Right: with built-in thermoelectric cooler (Φ15.4 mm))

conventional laser light sources. These features have expanded the range of gas sensing applications.

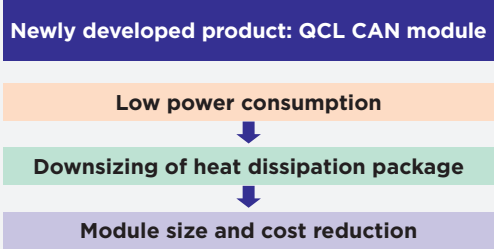
In the future, this module is expected to be used for applications in the industrial field to measure exhaust gases and greenhouse gases as

well as for other various IoT sensing applications, including those in the medical and healthcare field such as breath diagnostics and blood sugar level measurement.

* QCL : Quantum Cascade Laser

QUARTERLY id

Topics from
the future-shaping
Sumitomo Electric
Group



Volume comparison between the conventional and newly developed modules

	HHL module (conventional)	CAN module (newly developed)	
Module			
Volume ratio	180	15	1

Supporting Human Resources Development and Academic Promotion Both in Japan and Abroad



President Osamu Inoue presenting a catalog

On the occasion of the 110th anniversary of its foundation in 2007, the Sumitomo Electric Group established its basic policies on social contribution. The Group is promoting social contribution activities under the themes of “respecting human resources,” “attaching importance to technology,” and “contributing to the improvement of the environment and society.” The Sumitomo Electric Group CSR Foundation (President: Osamu Inoue), a public interest incorporated foundation established in 2009



Assoc. Prof. Mitsuru Hayashi giving a research presentation

based on these basic policies, has so far made donations to 17 university courses, provided grants for 162 academic and research projects, and paid scholarship benefits to a total of more than 900 students (total amount of about ¥1.2 billion).

In February 2018, the presentation ceremony for fiscal 2017 was held and the representatives gave a presentation of the research achievements. Associate Professor Mitsuru Hayashi, Kobe University, who gave a presentation on tsunami

marine hazards, expressed her intentions, saying, “I will widely make public the research results and promote countermeasures in cooperation with public agencies and the private sector for the benefit of society.” Assistant Professor Tomohisa Takamatsu, Tohoku University expressed his gratitude by saying, “I am really grateful for the grants provided to research projects in new

fields, where actual achievements will come in the future.”

This Foundation will continue to widely contribute to society by making donations to excellent university courses that contribute to the development of industrial society, providing grants for pioneering and creative natural and social science research projects aiming to solve important current issues, and paying scholarship benefits to talented students both in Japan and abroad.