

Message from the President

We seek to always anticipate changing needs,
tackle the challenges of innovation,
and be a corporate group that achieves continuous growth.



I had the honor to be appointed president of Oji Holdings in April 2019. I would like to discuss the strong commitment of Group management and employees to the long-held mission of the Group—to contribute to the genuine enrichment of society—and how we are carrying out that mission.

■ Oji Group—Development Since its Foundation—

The origins of the Oji Group can be found 146 years ago in 1873 when Eiichi Shibusawa established Shoshi Kaisha with the aim of developing the domestic paper manufacturing industry, which until then had relied on imports. He was committed to supporting social and economic development in Meiji Era Japan through the proliferation of books and newspapers to raise the level of knowledge of the public. Today, we engage in a wide range of businesses including book paper and newsprint in the Printing and Communications Media Business as well as packaging materials, household paper, and disposable diapers in the Household and Industrial Materials Businesses, specialty paper, thermal paper, adhesive products, and film products in the Functional Materials Business, and pulp sales and electric power generation using renewable energy in the Forest Resources and Environment Marketing Business. Also, our business is not limited to Japan and has expanded globally.

■ Sustainability Strategy

We have established resource circulation throughout the value chain so that our business activities contribute to the development of a sustainable society, namely through Forest Recycling*, Paper Recycling, and Water Recycling.

Forest Recycling

The Oji Group owns 190,000 hectares of forests in Japan, the largest private holding in the country, and an additional 250,000 hectares of forest plantations overseas. At these Oji Forests, we conserve forest resources based on the belief that “those who use trees have the responsibility to plant trees.” We practice sustainable forest management while continuously planting trees.

In addition, through the maintenance of the precious forest resources of Oji Forests, measures against global warming via CO₂ absorption and fixation in forests, and conservation of precious animals and plants that live in the forest, we are contributing to the maintenance of biodiversity.

Paper Recycling

We undertake continuous paper recycling by encouraging waste paper recycling and establishing a waste paper recovery system.

Water Recycling

We develop water treatment technologies to promote reuse of wastewater in our paper and pulp manufacturing processes.

We are making further advances in paper manufacturing technologies and achieving innovations in the development of new materials such as cellulose nano-fiber (CNF) and advanced paper with functions that can serve as alternatives to plastics. In addition, we are applying fundamental paper manufacturing technologies using forest resources to develop the renewable energy business such as biomass power generation.

We seek to maximize the value of diverse forest resources and to pass healthy forests on to future generations. By doing this, we provide value to society. We are committed to fulfilling the responsibility of continuing to provide value to society into the future.

* Forest Recycling: Sustainable Forest Management

■ Management Strategy: FY2016–2018 Medium-Term Management Plan

Next, I would like to discuss our management strategy. The management strategy is a key roadmap that urges us strongly along the path that we should take. Under the previous medium-term management plan, which ended in FY2018, we set as our fundamental strategies **Expansion of Overseas Business, Concentration and Advancement of Domestic Business, and Enhancement of Financial Foundations**. We worked to achieve our performance indicator targets of 100 billion yen in consolidated operating profit, an overseas sales ratio of 35 percent, and interest-bearing debt of 700 billion yen.

With regard to **Expansion of Overseas Business**, we increased the number of manufacturing sites, particularly in the packaging business, increased production capacity and efficiency, and focused on entering new business fields in Southeast Asia.

In relation to **Concentration and Advancement of Domestic Business**, we worked to raise earnings capacity by cutting costs and reorganizing production structures. In addition, we used core Oji Group technologies to develop high-performance and high added value products and focused on expanding the renewable energy business including biomass and hydroelectric power generation.

With respect to **Enhancement of Financial Foundations**, we improved operating cash flows, sold off shares held for strategic purposes and idle assets, and worked to reduce interest-bearing debts.

These efforts produced results, with consolidated operating profit reaching 110.2 billion yen in FY2018 (up 38.2 billion yen compared to FY2015) and interest-bearing debt falling to 620.6 billion yen (down 157.1 billion yen compared to FY2015). Thus, we achieved both our earnings and financial targets. The overseas sales ratio was 32.0 percent (up 4.2 points from FY2015), falling below the target, but over the three years of the plan, we steadily reinforced structures for increasing overseas profits.

■ Management Strategy: FY2019–2021 Medium-Term Management Plan

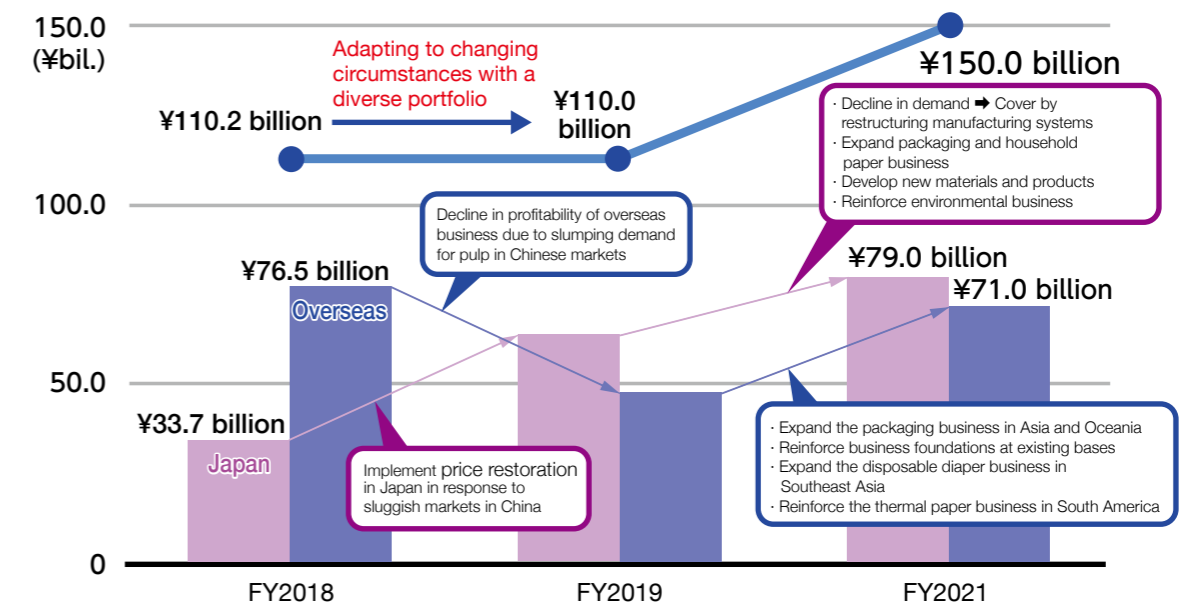
We are now carrying out our new Medium-Term Management Plan covering the period from FY2019 to FY2021. The fundamental policies of our current management strategy comprise three pillars: **Profitability Improvement of Domestic Business, Expansion of Overseas Business, and Promotion of Innovation**. Also, we will pursue **Contribution to a Sustainable Society**, as a cornerstone of the fundamental policies.

With regard to the management targets for FY2021, consolidated operating profit of 150 billion yen is the target for FY2021, the final year of the Medium-Term Management Plan, and this includes a target of maintaining stable operating profit of at least 100 billion yen each year. We will also pursue an overseas sales ratio of 40 percent and ROE of 10.0 percent.

Performance Indicator Targets Under the FY2019-2021 Medium-Term Management Plan

- Consolidated operating profit: At least 150 billion yen (maintain stable operating profit of more than 100 billion yen)
- Overseas sales ratio: 40% (with a target of more than 50% in the short term)
- ROE: 10.0%
- Net D/E ratio: Maintain current status * FY2018 result: 0.7 times
- Market capitalization: At least 1 trillion yen

Operating Profit from FY2018 to FY2021



The direction that the Oji Group will take in the future has not fundamentally changed. Optimal manufacturing structures will be created throughout the Group through a process of selection and concentration of existing businesses, and we will commit to enhancing businesses that are promising and hold the potential for growth and creating new businesses that will become our new core businesses. At the same time, we will respond in a timely and appropriate manner to changes in the business environment. Until now, we have been sensitive to changes in global and domestic circumstances, taking various anticipatory actions to establish a diverse business portfolio. We will reinforce foundations so that a wide range of business fields and territorial areas can complement one another and generate synergy effects in the pursuit of even further growth.

Now, I will describe the three pillars of our fundamental policies in detail.

First is **Profitability Improvement of Domestic Business**. As demand for newsprint and printing paper continues to decline in domestic business in conjunction with the rapid advancement and proliferation of information and communications technologies, we will continue our efforts to secure cash flows through extensive cost cutting. We will also shift our strategies towards the generation of cash flows through maximum effective utilization of existing facilities, thereby enhancing the earnings capacity of domestic business.

Specifically, we are building optimal manufacturing systems for newsprint and printing paper and rapidly shifting excess facilities to growth businesses. Oji Paper Co., Ltd. and Oji F-Tex Co., Ltd. have made decisions to shut down a total of three printing and communication paper machines. In addition, one newsprint machine at Oji Paper Tomakomai Mill that is no longer needed will be modified into a containerboard and kraft paper machine. As a result, we will work on achieving substantial cost improvements, enhancing international competitiveness, and increasing cash flows.



We are also steadily developing the potential of promising businesses. In the corrugated container business, for example, we are constructing a state-of-the-art containerboard plant, one of the largest in Japan, in Funabashi City, Chiba Prefecture in the Kanto region, which is expected to experience particularly significant increases in demand. We are also expanding business by promoting total packaging including new product development and sales, containerboard manufacturing to corrugated container converting, and packaging machine sales and maintenance by using our proposal capabilities as a strength.

In the household paper business, MPM Oji Home Products Co., Ltd., a joint venture with Mitsubishi Paper Mills Limited with a production base in Hachinohe City, commenced production in April 2019. Having acquired its first household paper production site in the Tohoku region, the Oji Group plans to expand sales and streamline logistics further. Furthermore, a household paper base paper machine will start operating in China in 2020. In Japan, we plan to establish a new converting base in Edogawa-ku, Tokyo, to increase household paper supply capacity in the Tokyo Metropolitan region. We will expand business through collaboration between domestic and overseas operations.

In the energy business, we will expand the biomass power generation business even further. A biomass power generation facility in Hachinohe City, a joint venture with Mitsubishi Paper Mills Limited began operations in 2019, and a joint venture biomass power generation facility established with ITOCHU ENEX Co., Ltd. will commence operations in 2022. In conjunction with the expansion of the biomass power generation business, the biomass fuel business is also being reinforced.

Until recently, the Oji Group's capital and business alliances with Mitsubishi Paper Mills Limited have been confined to sporadic cooperative relationships in specific business fields such as the household paper and energy businesses. Going forward, we will expand and reinforce this relationship. We will actively undertake measures to cut costs through the elimination of duplicative transportation, joint procurement of raw materials and facilities, and development of new products through joint development, and to make reciprocal use of each other's sales channels with the aims of increasing the competitiveness and raising the earnings capacity of both companies.

Next is **Expansion of Overseas Business**. Overseas business has been expanding rapidly since about 2010. At that time, overseas business accounted for less than 10 percent of sales, but surpassed 30 percent in FY2017. We have set a target of 40 percent for FY2021 as a transitional point on the way to our future target of 50 percent. Our overseas business has already exceeded our domestic business in terms of the number of companies and the number of employees, and by combining our capabilities throughout the Group, we will further expand sites and territories while creating inter-business and inter-site synergies for dynamic growth to boost competitiveness and enhance our presence.

Looking to individual businesses, in the corrugated container business, we are expanding business and increasing the number of sites with a focus on Southeast Asia and India while reinforcing business foundations. We are installing an additional containerboard machine in Malaysia and building corrugated container converting plants in India, Vietnam, Cambodia, and Indonesia in stages. Particularly in Indonesia, we decided to construct a corrugated container plant through a joint venture with a leading firm, enabling the Oji Group to enter business in the country. The region continues to develop economically, and we will seek to steadily capture the growing demand for corrugated containers and increase our market shares.

In the disposable diaper business, we are conducting business in Indonesia through a joint venture with Indofood, a leading local company. While the JV company has conducted OEM sales since the end of 2016, it will begin operation of its own production facilities in March 2020. We will work to expand sales, secure cost competitiveness, and strengthen business foundations. In Malaysia, we are conducting manufacturing and sales at two sites, and exporting products to Vietnam and other neighboring countries. In China and Southeast Asia, there is a preference for high-quality, high added value, made-in-Japan products, and we will take advantage of this to expand exports from Japan and increase sales.

In the pulp business, we continue to implement strategic revenue management measures in order to reinforce business foundations that are resilient against price fluctuations in pulp markets. Pulp markets have been affected by trade frictions between the U.S. and China, making the business environment more demanding. Under these circumstances, we are implementing daily cost improvements so that we can maintain stable quality and fulfill our supply responsibilities. We are taking measures in various regions including updating manufacturing facilities in Brazil and stabilizing and enhancing the efficiency of operations in New Zealand.

With regard to **Promotion of Innovation**, we are advancing the technologies accumulated in the paper manufacturing business even further and accelerating new materials development, which will become our core businesses in the future, to ensure the sustainable growth of the Oji Group.

Specifically, we are developing applications for cellulose nano-fiber (CNF) by extending pulp fibrillation technologies, fibrillating wood fiber on the nano-level, and using the nano-fiber not only as a raw material for conventional paper, but also as an alternative for glass and plastics.

The issue of plastic in the ocean is currently attracting considerable attention. The Oji Group is participating as a founding member in the Clean Ocean Material Alliance (CLOMA), a platform for promoting measures to address the issue of plastic in the ocean by industry as a whole, and undertaking joint measures with other industries to reduce waste. CLOMA has set five Key Actions, of which one is developing and using paper and cellulose materials. As a part of these efforts, we are developing and using different types of paper materials such as barrier paper with barrier properties not found in conventional paper and various liquid containers.

We are also establishing a bio-refinery that can effectively use the byproducts generated when pulp is produced from wood materials. In addition to developing sugars derived from non-edible raw materials as new raw materials for biodegradable plastics through the application of saccharification technology, we are promoting developments of therapeutic agents for equine arthritis, therapeutic agents for human cystitis, and an anticoagulant necessary for dialysis (heparin; currently produced from cows and swine and thus cannot be used by certain persons because of religious grounds) using sulfated hemicellulose at a life science research organization which we established with Hokkaido University.

As we undertake the development of new materials that will be at the core of our business in the future, we are also conducting green innovation (development of eco-friendly products) using wood materials produced through sustainable forest management.

Based on the three pillars of the fundamental policies of our management strategies that I discussed above, we will continue contributing to the formation of a sustainable society by reinforcing the Oji Group's environmentally-friendly business in Japan and overseas and pursuing innovation.

■ Safety, the Environment, and Compliance as the Top Priorities in Management

As I mentioned, management strategies are important as indicators of the path that we should take, but above all else, Safety, the Environment, and Compliance are the highest priority management issues over the business.

As long as a company exists, it must ensure the safety of the people who work for it. When safety is impaired, the health and happiness of employees and their families can be lost in an instant. I see my own role as ensuring that the employees who report to work healthy in the morning are able to return home healthy at the end of the day, and I seek to make this known at every opportunity. As the Group expands, the scope of this also grows. Protecting the more than 36,000 Group employees in Japan and overseas as well as all of the people involved in our value chains is an ongoing issue. We are committed to maintaining safe and reassuring work environments by conducting various trainings to raise employee safety awareness and enhancing the safety of equipment.

I also want to act in good faith at all times with respect to the diverse stakeholders who are essential for the company's existence. We will continue comprehensive environmental measures including compliance with environmental laws and regulations and preventing environmental accidents on the Group level and at individual business sites to maintain plants and offices that can exist in harmony with local communities and residents. This also applies to our compliance initiatives. We will conduct business in a manner that proves worthy of the trust that we have established over the Group's 146-year history.

■ Message to Stakeholders

We move forward every day with the support of diverse stakeholders including shareholders and investors, customers, business partners, local communities, global society, and employees. We achieved our long-held target of 100 billion yen in operating profit last fiscal year, but the business environment is by no means grounds for optimism. Nonetheless, we have built business foundations that will enable us to transform difficult circumstances into opportunities and pursue growth. Just as the era name in Japan changed this year from Heisei to Reiwa, we will anticipate changing needs, undertake the challenges of innovation, and strive to be a corporate group that achieves sustainable growth.

We will continue to make every effort to meet the needs and expectations of stakeholders. I look forward to your continued understanding and support.

Creating Innovative Value

With the aim of creating new business and strengthening the competitiveness of the company's existing businesses in mind, the Oji Holdings Innovation Promotion Division undertakes activities ranging from the creation of technological seeds to the development of new markets and new products that are more business-oriented, thereby propelling the company's business restructuring.

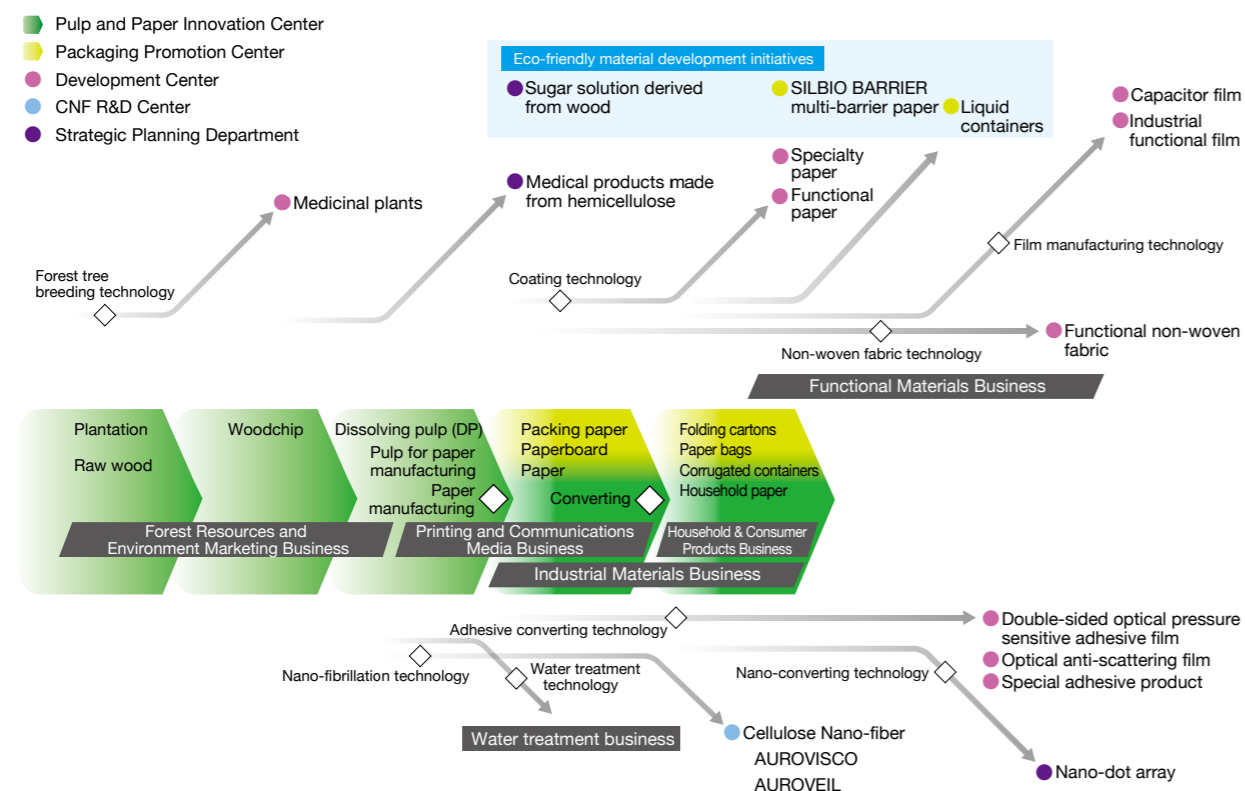
Priority Strategies of the Innovation Promotion Division

- Creating technological seeds and capturing needs
- Building business models and establishing value chains
- Strengthen cost competitiveness through refinement of pulp and paper technologies

Ongoing Innovative Value Creation by the Innovation Promotion Division

The Division is evolving underlying core technologies cultivated from paper manufacturing and film converting to promote the development of new business and new products and achieve early profitability. The Division is also developing eco-friendly products and technologies as a form of contribution to the realization of a sustainable society. Specific projects include development of technology for producing sugar from wood for use as a raw material of biodegradable plastic and development and application of paper materials with high barrier properties as an alternative to plastic for containers and packaging material.

The Division is also developing medical products made from hemicellulose which has had only limited applications, creating uses for cellulose nano-fiber using proprietary technologies, promoting the water treatment business using technologies acquired through paper manufacturing, and developing capacitor films for electric and hybrid vehicles to support the potential widespread adoption of eco-cars.



Eco-Friendly Material Development Initiatives

The Oji Group is developing eco-friendly materials to address the issue of plastic in the ocean, a global scale problem, and to contribute the reduction of CO₂ emissions as a measure to fight global warming. By developing paper materials that can take the places of plastic packaging and biomass*¹ plastic materials made from renewable forest resources, the Group seeks to contribute to the development of a sustainable society.

*1 Renewable, bio-derived organic resources excluding fossil resources

Development of biomass plastic raw materials

Biodegradable plastics have been the subject of considerable attention in recent years, and much of the sugar used as a raw material is produced from sugarcane or corn. There are concerns that sugar produced from edible resources will result in food competition in relation to global food supply shortages.

The Oji Group is researching the production of sugar by breaking down wood components (cellulose) using enzymes through the application of technologies acquired from bioethanol research. The aim is to supply sugar derived from non-edible sources as a new raw material for the production of biodegradable plastics, demand for which will increase in the future.



Cellulose-derived sugar solution
(Left: Unrefined product; right: refined product)

Development of paper materials as alternative to plastic packaging

Development of multi-barrier paper

The Oji Group developed SILBIO*² BARRIER, a multi-barrier paper made from a paper base with a barrier coating layer, using its water-based coating technologies, one of the Group's areas of specialization.

The barrier coating layer prevents water vapor, oxygen, and other substances from passing through, curtailing deterioration of the content and maintaining aroma and moisture content.

*2 SILBIO = SILVA+BIOREFINERY

Silva means forest in Latin. The name was coined to incorporate the intent to create eco-friendly products that enrich society using biorefinery technology from forests.



SILBIO Barrier was presented at a G20 Summit (held in Karuizawa-machi, Nagano Prefecture on June 15 and 16, 2019) ministerial meeting as an innovative initiative from Japan.

Development of pulp composites

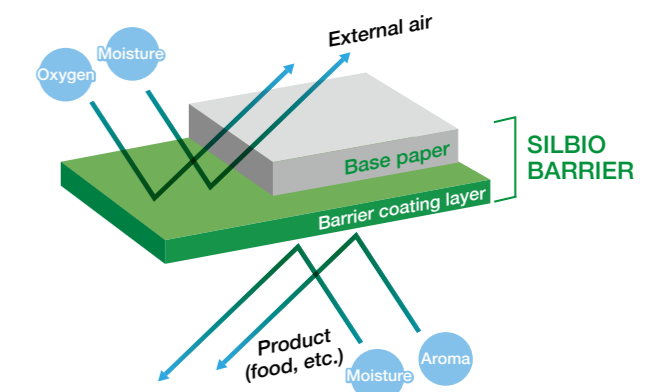
By mixing pulp into biodegradable plastic, various properties including strength and rigidity can be improved. The Group is conducting research as a means of expanding applications for biodegradable plastics.



Examples of processed pulp composite materials

Development of biomass plastic film

Biomass-derived plastic films are expected to be used for food packaging and an expanding range of other applications in the future. The Oji Group has commenced development of distinctive biomass plastic films through the application of thin film stretch processing technology accumulated in the development of capacitor films.

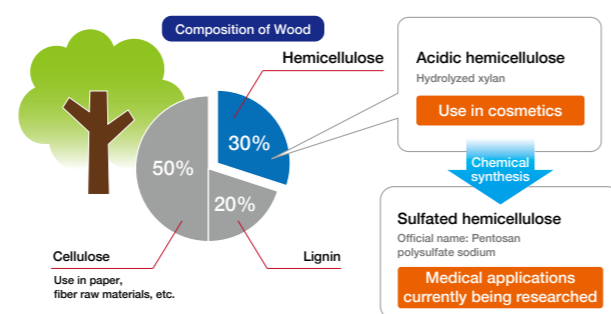


Structure of SILBIO BARRIER

Development of Medical Products Derived from Hemicellulose

The components of wood are mainly composed of cellulose, hemicellulose, and lignin. Cellulose has extensively been used as a raw material for paper and textiles without waste, but we are advancing research and development to use hemicellulose, which has been utilized as a fuel and other limited applications, as a product with higher added value. Acidic hemicellulose (hydrolyzed xylan) refined from hemicellulose is used as a raw material in cosmetics, as it provides skin moisture retention properties and protects the barrier function. In addition, a substance referred to as sulfated hemicellulose (pentosan polysulfate sodium: PPS) that is refined and chemically synthesized from acidic hemicellulose is attracting attention as an active pharmaceutical component, and the Group is conducting joint research and development with Hokkaido University.

PPS has the following effects: (1) suppressing arthritis symptoms, (2) suppressing bladder inflammation, and (3) suppressing blood coagulation. The Group is conducting development with the aims of use for effect (1) as a pharmaceutical agent for animals (in particular, horses) and for effects (2) and (3) as a pharmaceutical agent for people.



Application of People- and Eco-Friendly Temporary Materials at Civil Engineering Sites

The Oji Group and Shimizu Corporation jointly developed KAMIWAZA, a technology for improving the productivity of temporary construction using people- and eco-friendly paper materials. KAMIWAZA is a solution that uses paper materials in temporary structures at civil engineering sites. By using easily handled paper materials as an alternative to conventional steel and wood, the burdens on workers are reduced and the productivity of temporary construction can be enhanced. The main materials used for temporary construction are HiPLE-ACE^{*1} manufactured by Oji Interpack Co., Ltd. and Hatosheet^{*2} manufactured by Oji Kinocloth Co., Ltd.



HiPLE-ACE manufactured by Oji Interpack



Hatosheet manufactured by Oji Kinocloth

- ^{*1} HiPLE-ACE
A corrugated board material with a three-layer structure that is used as packing material for heavy loads and has high shock absorption performance and high strength.
- ^{*2} Hatosheet
A nonwoven fabric made primarily from wood pulp that is capable of controlling the diffusibility, retentivity, and volatility of liquids that it absorbs. Verification tests of the temperature increase prevention effects were carried out during dam construction in Iwate Prefecture by installing Hatosheet that contain water in an aggregate storage facility for concrete materials.

HiPLE-ACE Use Example: Tunnel Wind Gates

The temporary tunnel wind gates constructed in mountain tunnels are used to prevent rapid airflows that can occur during tunnel boring. With conventional construction techniques, special-purpose (disposable) nylon balloons were used to build a wall blocking the tunnel cross-section. When HiPLE-ACE is used, a wind gate of approximately 100 m² can be constructed by attaching corrugated board members (with an area of approximately 1 m²) with one-touch technique using just an aerial work platform. In addition, the corrugated board can be recycled and construction costs can be cut by approximately one half compared to conventional methods. The photo to the right shows an example from a road tunnel worksite in Nagasaki Prefecture.



New construction method using HiPLE-ACE

Development of Cellulose Nano-Fiber

Cellulose nano-fiber (CNF) is a plant fiber (pulp) that is finely fibrillated to the nano-order level, 1/1,000,000 of 1 mm, where its width is equivalent to 1/20,000 of a hair. Oji Group is conducting development for commercialization of CNF with the aim of application of phosphorylated CNF, a proprietary technology, in a wide range of fields.

CNF Reinforced Polycarbonate Resin

Polycarbonate (PC) resin is lightweight, highly transparent, and shock resistant material expected to be used as an alternative to glass for automobile windows, but it also has weaknesses—it is easily bent by force and deformed by heat. These weak points can greatly be improved by creating a compound of CNF and PC. The Oji Group is developing applications such as automobile windows with an aim of practical application at an early stage.

Composite of CNF and polycarbonate



CNF for Use in Cosmetic Ingredients

Working with Nikko Chemicals Co., Ltd., a leader in the cosmetics materials industry, the Oji Group commercialized AUROVISCO CS, a cosmetic ingredient.

AUROVISCO CS boasts more than 100 times the viscosity of naturally-derived thickeners but has a non-sticky and moist feel. Moreover, the wood fiber used as a raw material is a sustainable and renewable resource that can be supplied from forests. It is expected that AUROVISCO CS will be adopted in various cosmetics.



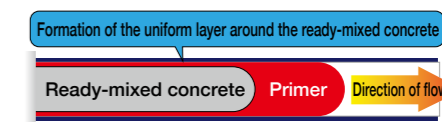
Cosmetics products

CNF Used as Concrete Pump Primer

The Oji Group began sales of AUROVISCO for use with RUBURI concrete pump primer* made by TAKEcite Co., Ltd. in January 2019.

Approximately 1 ton of conventional mortar is typically used, but when RUBURI mixed with CNF is used, this amount can be significantly reduced to tens of kilograms, slashing the amount of industrial waste generated. It also contributes to greatly reducing work times. RUBURI was selected as a standardization project for the Standardization System for Cultivating New Markets by the Ministry of Economy, Trade and Industry of Japan, and once standardization is approved, uses expected to expand to a wide range of construction sites.

* Primer is used to form a uniform lubricating layer on the inner surfaces of ready-mixed concrete pumping pipes to prevent clogging of pipes when pressure is applied to pump the concrete.



Cross Section of a Pumping Pipe



A concrete pump truck pumping concrete

Expansion of the Water Treatment Business

Establishment of Water Treatment Technologies

The Oji Group provides water treatment systems suitable for all needs based on its operational expertise and water production and wastewater treatment technologies accumulated through paper manufacturing technologies over many years. The Oji Group has created new water treatment systems by combining proprietary chemical treatment with the OJI-MEMBRANE ultrafiltration membrane as well as remote support technologies that optimize facility operations and prevent problems before they occur using the Internet of Things (IoT).

Based on its established technologies, the Group will continue to develop new water treatment technologies so that it can provide integrated services from design and installation of water treatment facilities to supply of consumables and after-sales support including maintenance and management to customers in Japan and overseas.

Developing Overseas Business with a Focus on Southeast Asia

The Group's water treatment business is not limited to Japan. It is increasing in Southeast Asia including proposals for industrial water production equipment at an industrial estate in Thailand, water production facilities for a beverage company and drinking water production facilities and wastewater treatment facilities for a large-scale multipurpose facility in Myanmar.

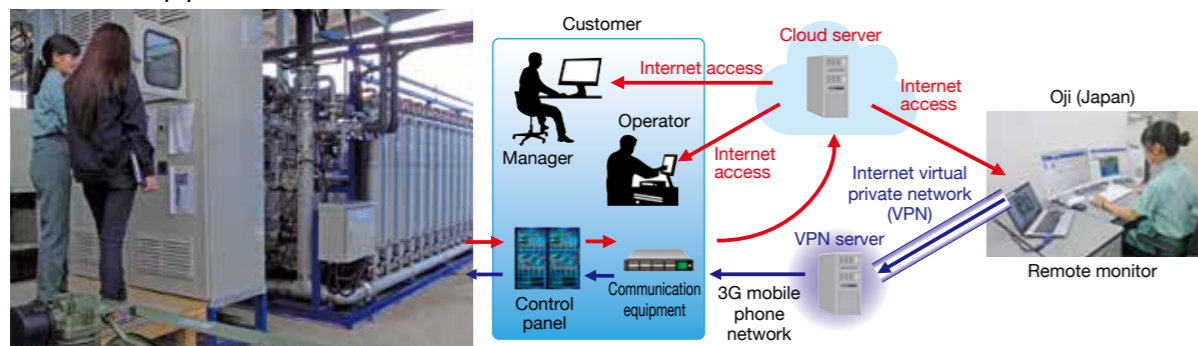
The Group has also conducted business seminars in Yangon, Myanmar's largest city, to provide education on preservation of water environments and undertakes other measures to contribute to local communities.

Going forward, the Group will develop its water treatment business overseas with a focus on Southeast Asia while generating synergy effects with other Group businesses.

Business conductor: Oji Engineering
Technology developer: Water Environment Business Promotion Section, Innovation Promotion Division

IoT-based remote support service introduced at industrial water production facility in Thailand

Ultrafiltration equipment



Proposals for water treatment chemicals



OJI-FLOCK™
(floculant)

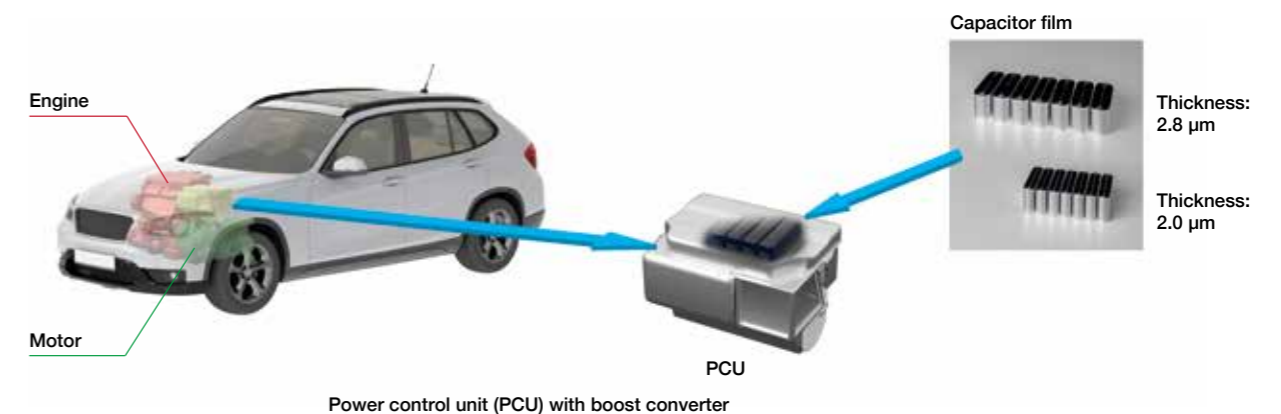
OJI-ION™
(ion exchange resin)

OJI-CARBON™
(activated carbon)

We use our accumulated expertise to propose appropriate water treatment chemicals that can ensure stable operation of equipment even when water quality varies depending on the external environment or operations.
[Products offered]
Flocculants for waste water treatment
Ion exchange resin for producing pure water
Activated carbon for deodorization and organic matter treatment
Chemicals for boiler water, etc.

Film Manufacturing Technologies Pursue “Thinner and Stronger”

The Oji Group's biaxially stretched polypropylene film has a wide range of applications in electrified vehicles including hybrid and electric vehicles. Electrified vehicles use highly safe film capacitors in inverters and other electric drive system components. The main component of those film capacitors is high-performance polypropylene film, and the thinner the film, the smaller the capacitors can be made. The solution of how to drive on electricity alone without using gasoline is attracting considerable attention worldwide, and the trend towards high voltages and high currents to obtain more powerful drive force is continuing, creating a need for high levels of insulation that can withstand high-voltage electricity even when thin. The Oji Group is leveraging its proprietary materials design technologies and stretch processing production technologies to develop technologies for producing ultra-thin, high-voltage resistant polypropylene film that can withstand high-voltage even when extremely thin. These efforts are contributing to making more compact electrical components for electric vehicles, which are expected to become more widespread throughout the world.



Japan's First Licorice Cultivation Technology Established

The Oji Group has commenced research on medicinal plants that hold future potential for use in Kampo medicines, the market for which is expanding, as well as cosmetics and functional foods. Licorice is used in approximately 70 percent of Kampo medicines. At present, most raw materials are dependent on imports of wild licorice from overseas, but there are calls for domestic production through the development of efficient cultivation techniques in order to respond to fear of resource depletion accompanying the increase in demand and export restrictions. The Oji Group established Japan's first licorice cultivation technology through the application of afforestation technology developed by the Group. The technology shortens the time from seed sowing to harvesting of licorice, from five to six years to just two years. Further, the glycyrrhizin amount conforms to the Japanese Pharmacopoeia's active ingredient standards of containing at least 2 percent glycyrrhizin in cultivated licorice. A large-scale cultivation trial was commenced in the Nayoro area of Hokkaido in 2017, and business feasibility is being verified. In the future, the Group will seek to achieve Japan's first large-scale cultivation with the aim of providing stable supply of domestic licorice to customers who emphasize safety, security, and traceability.



A large-scale licorice field (photo taken in summer 2019)