

Co-creation in the market for new engineered material

[Engineered Materials Sector]

Utilizing our core technologies, know-how and sales channels, we transform into a Market Co-creation business entity which works with market participants to create a succession of new products using our "Material Intelligence."

Besides maintaining a stable supply, it is essential for Engineered Materials Business to continuously create growing products and businesses.

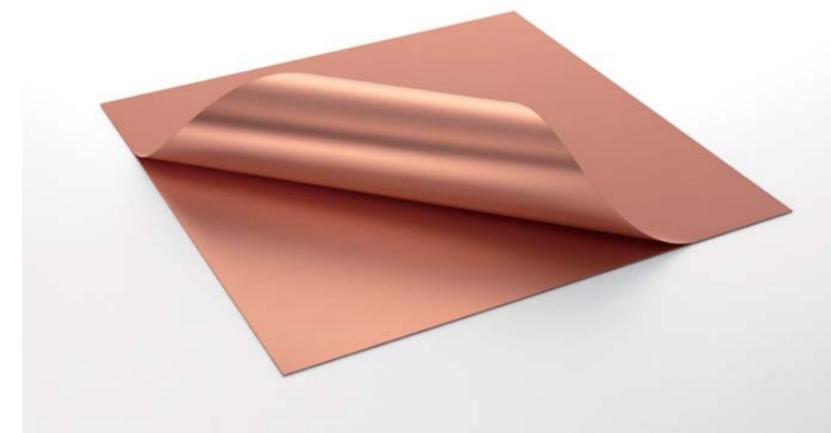
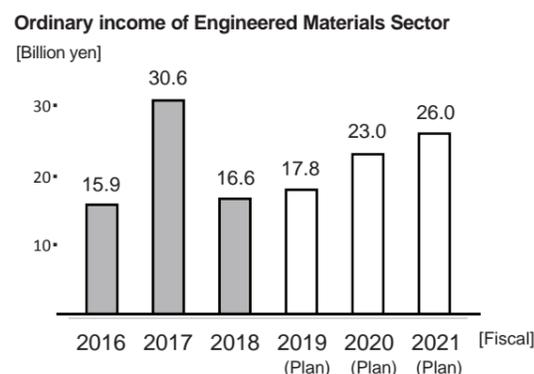
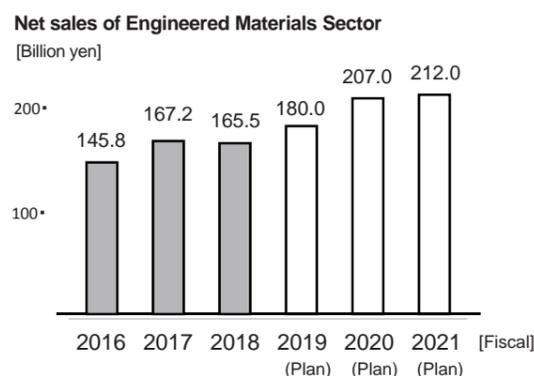
Many of the products handled by the Engineered Materials Sector are bound to lose their product value at some point. We have experienced it so far through the diversification of needs, fast-moving demand patterns, and the intensification of global competition. What is more, the product cycle today is much shorter than ever before. We need to establish a cycle in which we create growth businesses and products, enter the market early and make a profit while our products are still strong, and then link this to the next products and the next businesses to survive.

Our new three-year medium-term management plan has started. In this plan, the Engineered Materials Sector is undertaking many diverse initiatives to strengthen the functions of our Sector, such as marketing abilities and production technology capabilities. These efforts are being made not only to achieve the profit committed in this medium-term plan, but also to strengthen the foundation for promoting the development of new businesses, and to achieve transforming ourselves into a business organization that is able to co-create with the market.

We are steering the various operations within the engineered materials business to enable us to continuously create new businesses and products, which will not only serve to enhance our corporate value and the sustainability of our company, but also contribute toward enabling technological innovations in diverse industries including in the electronics field, and further help toward resolving the problems that the world is faced with. We are also continuously acquiring new partners for co-creation, and will accelerate our efforts within this medium-term plan toward achieving our vision. Please look forward to the growth and transformation of our engineered materials business.



Takeshi Nou
Representative Director, Managing Director,
Senior Executive Officer, Engineered Materials Sector



Copper foil with carrier film



Catalysts for detoxifying exhaust gases



Functional powders



Sputtering targets IGZO and ITO

Products with leading share in the global market

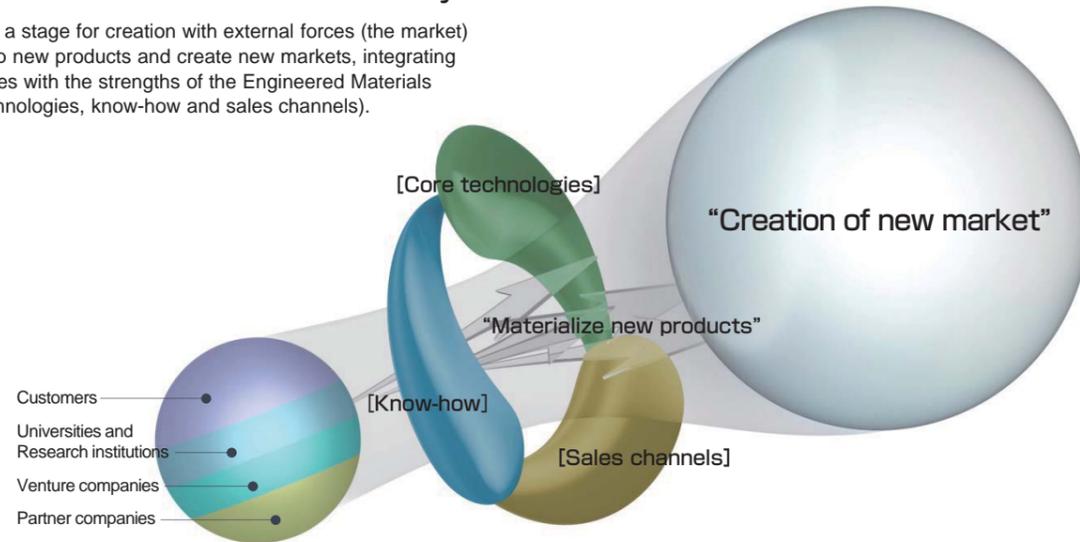
<p>For Semiconductor Package Substrate MicroThin™ copper foil with carrier foil Electro-deposited copper foil is used for wiring material in high-precision circuits. In particular, Mitsui Kinzoku has a high market share in carrier foil. These products contribute toward minimizing the sizes of smartphones and enhancing the advanced functions of electronic products.</p> <p>Global share 90%</p>	<p>For motorcycle Catalyst for detoxifying exhaust gas We are contributing toward the maintenance of a clean environment by detoxifying toxic substances such as CO and NOx that could cause air pollution. We are also increasing the supply of catalysts for four-wheel vehicles that we offer in the world market.</p> <p>Global share 60%</p>
<p>For hybrid car Buttery material (Hydrogen storage alloy) Mitsui Kinzoku started providing materials for batteries in the 1940s. Since then, the company started developing materials for rechargeable batteries at an early opportunity, and has been supplying hydrogen storage alloy for batteries used in hybrid vehicles since the 1990s.</p> <p>Global share 50%</p>	<p>For LCD display Indium tin oxide (ITO) target ITO, which is oxidized indium and tin, is an essential material for creating the transparent conductive film on liquid crystal displays. We make use of the capabilities held by Mitsui Kinzoku in creating products that offer a high level of purity, sintering technologies, and film formation. We also supply sputtering targets for IGZO.</p> <p>Global share 40%</p>
<p>For MLCC Copper powder Demand for MLCC (multi-layered ceramic capacitors) is increasing rapidly with the electrification of automobiles, the increased sophistication of smartphone functions, and the widespread application of IoT. We are contributing to this by providing materials toward the advancement of MLCC, such as in downsizing and increasing their capacity.</p> <p>Global share 35%</p>	<p>For glass substrate Cerium oxide abrasive This is a polishing material that is essential for polishing high-performance glass, such as optical lens, hard disk glass substrate, and liquid crystal glass panels. Mitsui Kinzoku's strength is not only in nonferrous metal materials, but also in rare-earth metals.</p> <p>Global share 40%</p>

<other products>

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> Battery-use mercury-free zinc powder Active materials for lithium-ion batteries Conductive oxide Magnetite Tantalum oxide Niobium oxide Atomized powder Solder powder | <ul style="list-style-type: none"> Fine powder Embedded Capacitance Materials for PCB Various refractories for super-high-temperature furnace Filtering equipment for molten aluminum Carriers for electrophotography Ferrite powder Iron powders Oxygen absorber | <ul style="list-style-type: none"> Calcium Fluoride (CaF₂) crystals for steppers Single crystals for optics Cadmium Tungstate (CdWO₄) crystals Single crystals for scintillation materials Detectors for X-ray computed tomography Photodiodes Rare earth oxides |
|--|---|---|

Change to a “Market Co-creation business entity”

We first cultivate a stage for creation with external forces (the market) and then develop new products and create new markets, integrating the external forces with the strengths of the Engineered Materials Sector (core technologies, know-how and sales channels).



Plan of Execution

FY2017

Strengthen research and development system, increase activities to explore market opportunities, and collaborate with entities outside the company.

FY2018

Strengthen joint development and collaboration and cooperation in research and development with entities outside the company, while continuing to explore market opportunities.

From FY2019 onwards

Build Market Co-creation research and development system and reflect these activities to our business performance.

Initiatives for Market Co-creation activities in FY2018

Place for meeting partners for market co-creation

During this fiscal year, we exhibited at three trade shows held both in Japan and overseas to send out information on our company's products as well as on our R&D products. At the Neo Functional Material Exhibit (held at Tokyo Big Sight) in January 2019, we exhibited our products (6 products) and R&D items (5 products), which attracted the interest of people from diverse industries.

Exploring business opportunities in the life sciences field

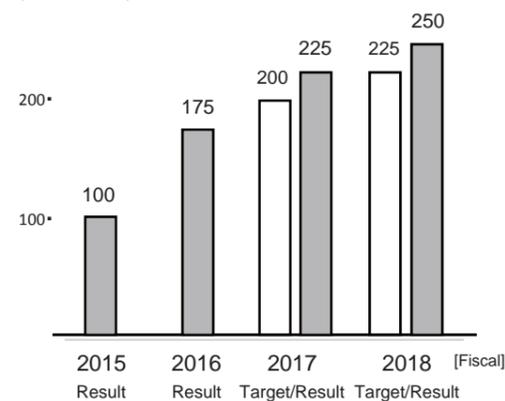
Goryo Chemical, Inc. (head office in Sapporo City, Hokkaido Prefecture) is a venture company that came out of Hokkaido University. This company seeks to develop, manufacture and sell its unique and “Japan made” series of fluorescent reagents which are not produced at any other company, and also seeks to achieve the commercialization of diagnostics that use fluorescent probes for cancer.

Our company invested in this company through CVC. We are actively deploying our unique materials so that they can be applied toward Goryo Chemical's product development in the biochemical field.

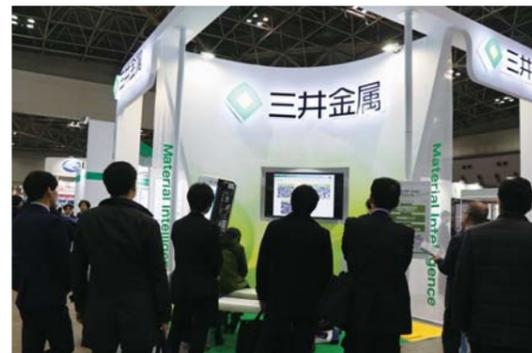
Furthermore, the above activity will be used as a foothold toward entering into a new market area for us. As such, from now on, we will pursue business opportunities in the life sciences field based on our concept of “Material Intelligence” as upheld in our company's slogan.

Market Co-Creation Activity Index *

(FY2015 = 100)



* Market Co-Creation Activity Index
Index reflects the combined total of joint R&D projects and business collaborations.



Exhibition booths at the Neo Functional Material Exhibit (held at Tokyo Big Sight)

SWOT analysis

Strengths

- High quality and high performance product lineup that makes use of our core technologies and know-how
- Manufacturing and sales structure of being “located at the consumption site” with a focus on Asia
- Structure for creating new businesses through collaborations with external institutions

Weaknesses

- Product composition that is susceptible to changes in the economy
- Short life cycle of products
- High-cost structure resulting from multiproduct production

Opportunities

- Pursue new levels of quality and create demand through technological innovations
- Expand demand for high-functional products arising from increased sophistication of market needs
- Increased demand in final market from the emergence of developing countries

Threats

- Increased price competition with manufacturers in developing countries
- Reduced demand from the protracted trade friction between the United States and China
- Increased geopolitical risks regarding overseas materials procurement

Solutions and initiatives for major business segments in FY2019

Engineered powders

We will increase our efforts to expand sales of 5G-related products, as full-scale implementation of 5G is expected to start in 2020, and also of abrasives for which we enhanced our equipment in 2018. In particular, 5G is a field that is expected to create growth in such products as copper powder for MLCC, as electronic components become increasingly adapted for high frequency and high performance usage. Our business unit that deals with powders, which constitute our core technology, will strive to expand our business by operating a cycle of grasping market needs at an early opportunity and launching new products effectively.

Catalysts

We will maintain top share in catalysts for two-wheel vehicles, as well as for the stable supply of catalysts for four-wheel vehicles. Furthermore, in order to answer to the increasingly stringent global restrictions against emissions, we will proceed to enhance our research and development structure, while also implementing initiatives toward maximizing capacity utilization of the facilities, and will also proceed with making considerations for further increasing and strengthening our facilities.

Copper foil

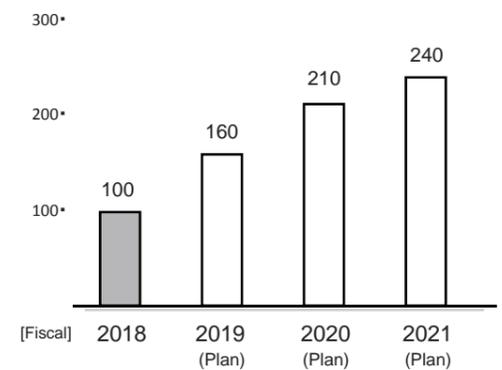
We will strive to expand sales of MicroThin™ for PKG other than smartphones, such as for external memories and GPUs, and also for 5G related products such as electro-deposited copper foils for high-frequency devices. We will also accelerate new product development by strengthening our marketing abilities and by enhancing partnership with engineers at our partner companies.

PVD materials

We will strengthen the competitiveness and increase the market share of ITO and IGZO. We will improve the framework for achieving continuous cost reduction, while also enhancing our business structure of being in close partnership with our customers.

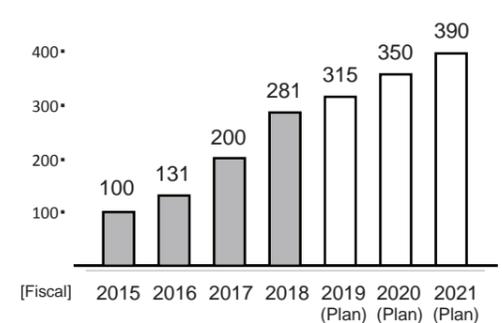
Sales projection for 5G affiliates

(FY2018 = 100)



Sales projection for Automotive catalysts

(FY2015 = 100)



Recycle-smelting ~ Implementing materials stewardship ~

[Metals Sector]

The strength of the Metals Sector is that it has accumulated smelting technologies and has multiple smelters. Through a shift in approach from the optimization of individual sites to total optimization through the enhancement of cross-site functions, we have further increased our business value.

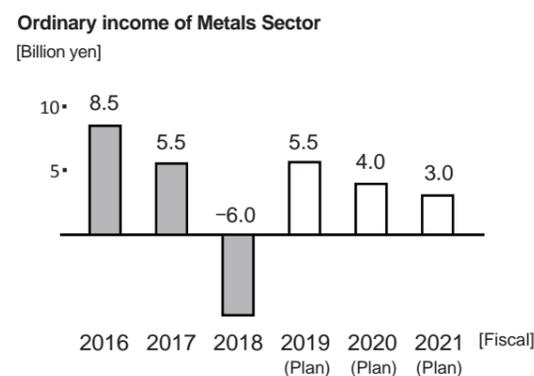
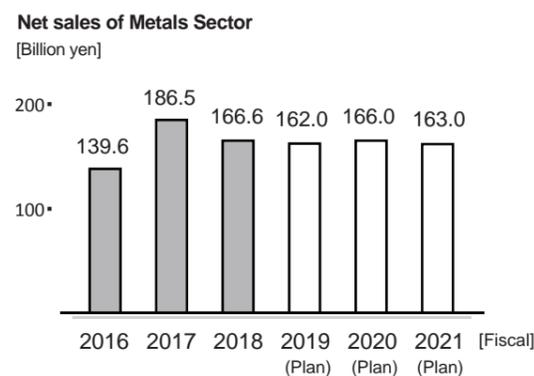
Since the early 1900s, we Mitsui Kinzoku have owned multiple non-ferrous metal smelters in Japan. We have possessed the consistent process from the mine to the smelter. Similarly in our overseas operations, we have not only invested in mines, but also undertaken mine exploration, development and operation ourselves. We are one of the few non-ferrous metal smelters to have done this in Japan.

Extracting lead from scrap batteries and valuable metals from industrial waste has begun early in the 1990s. We have implemented the process to the downstream activities, leading to “venous industries.” Material Stewardship is included in the 10 Principles for Sustainable Development advocated by the International Council on Mining & Minerals (ICMM), an international organization made up of mining and smelting companies. The aim is to promote the establishment of a material-cycle society through management of the entire industrial supply chain from mining, smelting, and processing to consumption, disposal, recovery and recycling of metal products. Mitsui Kinzoku is not a member of ICMM but we greatly approve of this principle. It is also in sync with our activities to date aimed at creating a sustainable supply chain.

Under our Medium-Term Management Plan, we are speeding up further the transformation of our business structure from a non-ferrous metals smelter, which uses concentrate as raw materials, to a recycling smelter. We are actively expanding our processing capacity of complex and refractory zinc ores, increasing lead blast furnace processing, and strengthening our capacity for collecting precious metals. We are also seeking to strengthen the system of collecting recycled materials for recycling, and developing new smelting processes to expand the scope of metals that can be recycled. We aim to expand the capacity of recycle-smelting, to increase benefits for a sustainable business entity, and to contribute to the creation of a resource recycling society.



Satoshi Tsunoda
Senior Executive Officer, Metals Sector



SWOT analysis

Strengths

- Mining**
- Operation of our own zinc mine in Peru over a long period of time
 - Production of high quality and clean zinc concentrates
- Smelting**
- Presence as a top manufacturer of zinc in Japan
 - Ability to process a wide variety of materials through a network of eight smelters in Japan and overseas
 - Operates ISP technology, of which there are only a few in the world, at Hachinohe Smelting Co., Ltd. Deepening the smelting network by combining hydrometallurgy and pyrometallurgy, and improving competitiveness.
 - Production of mixed zinc (high value-added product) for anti-corrosive zinc plating for steel sheets

Weaknesses

- Mining**
- Increased costs from deepening of mining locations
 - Locations that are distant from ports and consumption locations
- Smelting**
- Aging of equipment

Opportunities

- Mining**
- Increased market price for zinc
 - Possibility of technological development, such as improved recovery rate from the use of IoT
- Smelting**
- Global expansion of the recycled materials market due to enhanced eco-awareness
 - Stable growth of zinc demand, both globally and in the long term

Threats

- Mining**
- Decline of market price for zinc
 - Strengthened restrictions due to enhanced eco-awareness
- Smelting**
- Increased presence of Chinese zinc smelting
 - Gradual decline in domestic demand for zinc
 - Increased competition in collecting recycled material

Results and plans of Metals Sector

FY2018

We made solid strides in increased processing of recycled materials and recovery of by-products, but there is still much room for improvement, with issues still remaining to be solved.

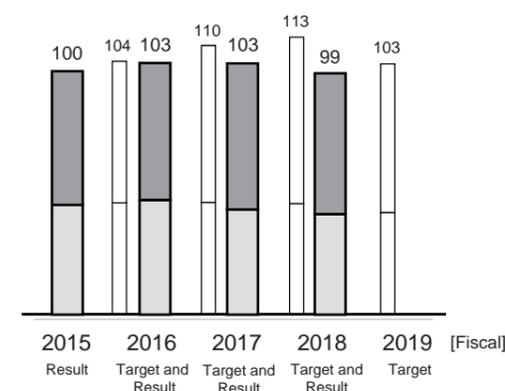
From FY2019 onwards

Organically link new processes to smelting network to obtain more diverse raw materials for recycle and increase processing capacity.

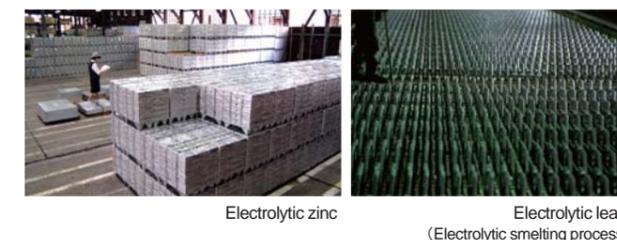
Expansion of recycle-smelting

(Total amount of raw materials in FY2015 = 100)

- Recycled material (zinc, lead, precious metals)
- Zinc concentrate, lead concentrate, etc.

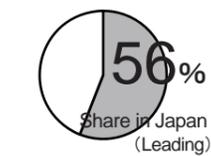


High share products



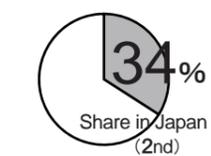
Zn (Zinc)

Iron is essential as a basic material for use by industries and in our livelihood. In addition, zinc is what protects iron from corrosion. Zinc powder is widely used not only as a coating material for steel, but also for die-casting and other processes of copper.



Bi (Bismuth)

Recovered as by-products of copper and lead ore, they are used not only as alloy material but also as material for pharmaceutical products, pigments, and also for compound semiconductors.



Pb (Lead)

Lead is acquired from battery scraps and ores, and because it is easy to process, it is used mainly for lead storage batteries, as well as for solder, lead pipes and sheets, X-ray shielding material, soundproofing material, and more.

<Other main products>

Zinc base alloys/Cadmium/Antimony trioxide/Refined copper/Gold/Silver/Sulfuric acid/ Selenium /Tellurium/Zinc ore/Lead ore

Continuous supply contributing to sustainable mobility

[Automotive Parts & Components = MITSUI KINZOKU ACT CORPORATION]

Leverage our “Manufacturing Intelligence” and provide continuously “Safety,” “Comfort” and “Amazing Performance.”

Continually enhancing quality and cost competitiveness as well as developing and sales expanding

of automotive mobility products are one of the processes for that purpose.

Contributing to the sustainability of the automotive industry has led to the building of a resilient society.

While MITSUI KINZOKU ACT CORPORATION (hereinafter “ACT”) was established in 2010, Mitsui Kinzoku’s automotive parts & components business dates back more than half a century.

The company first launched into the United States in 1987. Now, it has 11 production and supply sites through the world including a site in Morocco that will start operations next year.

Our system of regional business units which conduct business operations in each region is also established. We have cultivated local human resources at both operational and management level. Currently the percentage of employees holding local nationality in executive officer positions is around 30% and the percentage of women in management positions is around 20%.

As the new medium-term management plan just has started this fiscal year, and since this is an important period for us as we head along our path toward realizing our vision for 2024, both the head office and each business unit will work together as one toward “continually enhancing quality and cost competitiveness” and “focusing on winning major business deals.”

Our vision for 2024 is to be a company that provides products and services focused on safety, comfort, and amazing performance through the utilization of our strength in manufacturing capabilities. We will strengthen our quality and cost competitiveness by implementing ICT and other technologies in our production sites to develop smart factories, in order to improve productivity and enhance the quality of mass-produced items, as well as to reduce costs. We will also develop high quality products for door-related components in accordance with the electrification and automation of mobility, and propose such products on a global scale to our customers, in order to acquire large-scale orders and to expand our sales routes into the future.

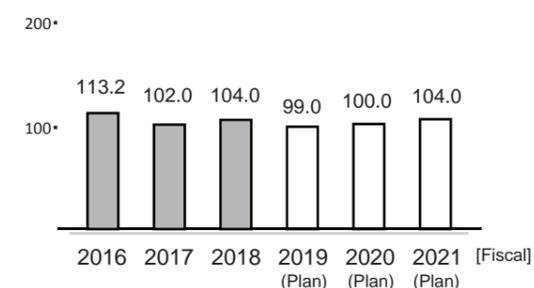
By establishing the ACT brand and strengthening customer trust, we believe we can contribute to the sustainability of the automotive industry.



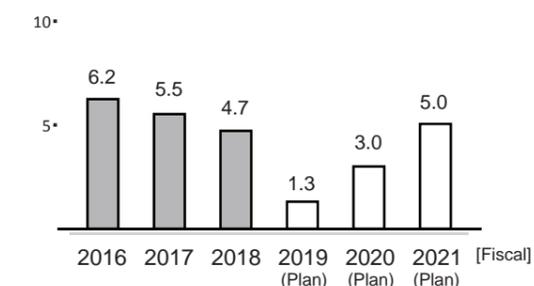
Hiroshi Igata

Senior Executive Officer of Mitsui Kinzoku, President and Representative Director of MITSUI KINZOKU ACT CORPORATION.

Net sales of MITSUI KINZOKU ACT group
[Billion yen]



Ordinary income of MITSUI KINZOKU ACT group
[Billion yen]



SWOT analysis

Strengths

- Technological abilities as a manufacturer specializing in components for the door area
- Long-term business partnership with outstanding Japanese OEMs
- Supply chain that enables stable supply on a global scale
- Integrated production at the major production sites that covers everything from pressing, resin formation, and assembly

Weaknesses

- In-store share among European and American OEMs
- Lineup of products for electric sliding doors and backdoor systems
- Alliance with other companies that complement our own technologies

Opportunities

- Alliance with European OEMs that do not have much business with the Japanese OEMs who are our customers, and increase sales opportunities toward European OEMs through joint purchases
- Increased sales opportunities for our company’s lightweight products and system products due to the electrification and automation of automobiles
- High barriers to market entry because of strict demands in terms of performance and required quality

Threats

- Emergence of giving priority to one’s own country, deceleration of the automobile market due to trade frictions, increased burden of customs expenses, changes in the currency exchange rate
- Market oligopoly by global mega-suppliers
- Emergence of new customers and competitors from the major transformation in the automobile industry

Key challenges

Achievements in FY2018

In order to meet the demand from our customers for enhanced safety and comfort, we developed and began offering the new two-stage seat back latch with added mechanism.

The proposals and development activities made by our company have earned high appraisals from our customers, which resulted in acquiring the Project Award in the technology category*.



* Toyota Motor Corporation
New model SUV Project Award

Seat Back Latch
(Two Stage Type)

Customer awards for our manufacturing sites

(Excerpts from the results in FY2018)

<Japan>

Toyota Motor East Japan, Inc. “Quality Control Award”
Tachi-S Co., Ltd. “2018 Quality Excellence Award”

<Other countries>

Dongfeng Nissan Passenger Vehicle Company “Excellent Supplier”
Honda Automobile (Thailand) Co., Ltd. “Quality Award”
Isuzu Motors Co., (Thailand) Ltd. “QD Certificate of Achievement”
Honda De Mexico, S.A.De C.V. “2018 calendar Supplier Performance Award”
Honda Cars India Ltd. “Cost Award”

From FY2019 onwards

Solid progress toward achieving our vision for 2024

We will develop high-quality products for use around doors in accordance to the electrification and automation of mobility, and to meet the needs of our customers. We will make proposals on a global level to our customers in order to acquire large-scale orders, and thereby realize expanded sales in the future.

Product lineup

Side Door Latch and Related Products

- Side Door Latch (Fully Enclosed Type)
- Side Door Latch (Integrated actuators)
- Side Door Latch (For Compact Cars)
- Check Link/Side Door Hinge



Back Door Latch

- Back Door Latch (Closer)
- Back Door Latch (Electric Release Type)
- Back Door Latch (For Compact Cars)



Power Sliding Door System

- Power Sliding Door Drive Unit
- Remote Control Unit
- Rear Latch/Auto Step



Power Back Door System

- Power Back Door Drive Unit
- Back Door Latch/ECU



Door Latch for automobile

Major products offered by Mitsui Kinzoku Act Corporation that have top-level shares in the world market are mechanical components that keep the doors firmly in place on the vehicle body. These parts are constantly required to be made smaller, more lightweight, and with improved performance, while also being required to have the strength to ensure the safety of the people in the vehicles.