JAPAN POWDER
METALLURGY ASSOCIATION

2023 JPMA Annual Report

Contents

Year ended December 31, 2023

Executive Director Report

Yoshio Uetsuki,
Executive Director

Dear friends,

We would like to express our sincere gratitude to everyone who has continued to cooperate with the activities of the JPMA.

Although the world's economy in 2023 is on track to recovery from the coronavirus pandemic, the global economy is currently slowing down. According to the World Economic Outlook released by the International Monetary Fund (IMF) on January 30, 2024, the global economic growth rate will remain almost unchanged at +3.1% in 2023, +3.1% in 2024, and +3.2% in 2025.

On the other hand, positive changes were observed in the Japanese economy during 2023. Although there were negative factors such as the tense situation in the Middle East and Ukraine, and a slowdown in the economies of emerging countries, the Japanese economy continued to return to normal due to multiple factors, such as the steady performance of the US economy. Additionally, the increases in domestic demand, such as personal consumption and capital investment, led to wage increases and price pass-through.

Although the business environment of the powder metallurgy industry is currently difficult, it is important to steadily work towards responding to electrification, developing new applications, and further innovating powder metallurgy technology.

<2022 Topics>

The JPMA Prize was established in 1979. In 2024, we celebrate our 45th year. It includes the PM Field Contribution Prize and the New Design Prize.

The PM Field Contribution Prize was awarded to one person. Four New Design prizes, one New Powders Prize, and two Effort Prizes were also awarded.

Our Major events include the Gathering of 2023 New Year Greeting and Ceremony of Awarding Various Honors in January 2023, the JPMA General Assembly in May 2023, and the Fall General Assembly in October 2023.

An important goal for us is the development of human resources through group activities. When the "2nd MIM Seminar (Beginner course)" was held, many of the participants listened to basic knowledge and improvement examples. Additionally, we held the "2nd Powder Metallurgy Basic Course" which contributed to the basic education of young employees.

The "New Project Activity," launched in 2021, is an activity for JPMA to achieve carbon neutrality and work towards an "Ideal model PM factory" in 2030 and 2050. The compiled results will be announced at WORLD PM2024 YOKOHAMA.

Regarding exchanges with overseas organizations, we participated in the "6th APMA2023 Gyeongju (South Korea)" in November as part of a cooperation at international conferences. The 17th APMA Board of Directors meeting was held to discuss future APMA venue cycles.

JPMA and JSPM are preparing for WORLD PM2024 YOKOHAMA, and considering various plans to make this event satisfiable for all participants. To make the conference successful, we need the cooperation of PM stakeholders around the world, so we would like to ask for your support. We look forward to seeing you in Yokohama in October 2024.

<Japanese PM Products in 2022>

Under the economic environment mentioned at the beginning, domestic production of automobiles, including buses and trucks, which is our key industry, increased by 14.8% from the previous year to 9 million units according to the Japan Automobile Manufacturers Association, due to the relaxation of semiconductor supply constraints. Domestic sales increased by 13.8% from the previous year to 4.78 million units. Both domestic production and sales increased for the first time in five years.

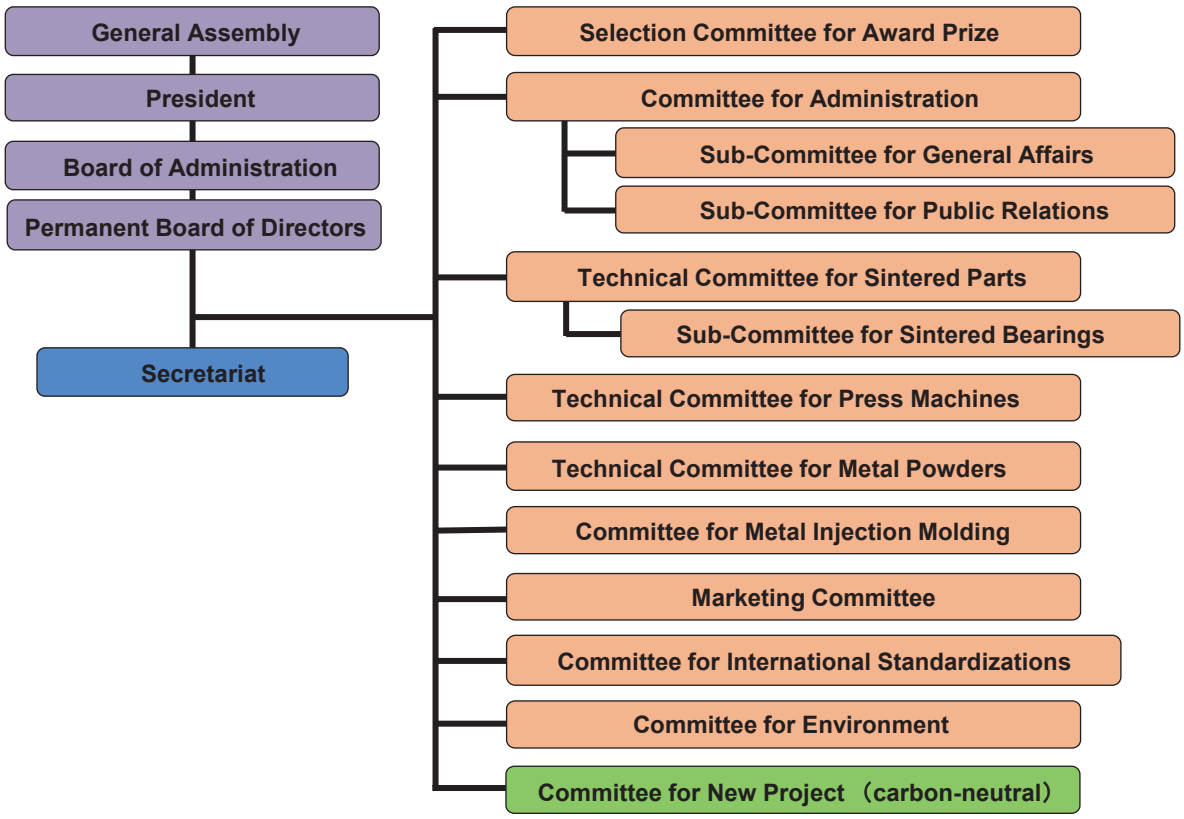
According to 2023 Trade and Industry statistics of the Ministry of Economy, the production volume of “PM Machine Parts,” which account for more than 90% of automobile parts, was 68,000 tons, down 2.5% from the previous year. The production value was 108.6 billion yen, an increase of 2.5% from the previous year. Compared to 2019, however, the production volume decreased by 21.1% and has not reached pre-coronavirus levels yet. There are concerns about a decline in demand for some engine parts and driving system parts. The production value was a 7.6% decrease compared to 2019, due to factors such as the unit price of raw materials and energy being decreased.

On the other hand, the production volume of “PM Bearings” in 2023 decreased by 4.4% from the previous year to 4.5 thousand tons, but the production value increased by 2.4% from the previous year to 16.1 billion yen. Compared to 2019, production volume decreased by 23.0%, but production value increased by 4.5% and exceeded pre-coronavirus levels. This is thought to be due to the unit price reflection of raw material and energy prices, as well as foreign exchange gains from the weaker yen on exported goods.

JPMA will continue to support the powder metallurgy industry in the future by collaborating with member companies engaged in real manufacturing, promoting the development of PM technology, responding to carbon neutrality, and developing human resources, as well as collaborating with the PM industry around the world. We are vigorously promoting activities for further development.

I would like to take this opportunity to express my sincere gratitude to everyone involved at APMA, MPIF, and EPMA for their continued cooperation. We look forward to your continued support for JPMA’s activities.

Organization of JPMA



Board Members

President

❒Mr. Hiroshi Ii

President

DIAMET CORPORATION

Executive Director

❒Mr. Yoshio Uetsuki
Japan Powder Metallurgy Association

Permanent Board Members

❒Mr. Shintaro Inoue
Sumitomo Electric Industries, Ltd.

❒Mr. Toshiya Yamaguchi
FINE SINTER CO., LTD.

❒Mr. Masashi Kikuchi
PORITE CORPORATION

❒Mr. Tsuyoshi Hasegawa
KOBE STEEL, LTD.

❒Mr. Shoichiro Tokumaru
JFE Steel Corporation

❒Mr. Syuzo Sonoda
FUKUDA METAL FOIL & POWDER CO., LTD.

❒Mr. Shoei Katano
Höganäs Japan K.K.

Board Members

❒Mr. Junichi Takahashi
IWAKI DIECAST Co., Ltd.

❒Mr. Akihiro Matsunaga
NTN Advanced Materials Corporation

❒Mr. Takashi Suzuki
NAPAC CO., LTD.

❒Mr. Masayoshi Nishimura
FUKUI SINTER CO., LTD.

❒Mr. Ikuo Sugie
Daido Steel Co., Ltd.

❒Mr. Takayuki Yoshida
Dowa Electronics Materials Co., Ltd.

❒Mr. Jiro Bando
Nippon Atomized Metal Powders Corporation

❒Mr. Takefumi Matsushima
Mitsubishi Materials Techno Corporation

Auditor

❒Mr. Seiji Shimizu
NTN Advanced Materials Corporation

❒Mr. Yasushi Mori
Nippon Atomized Metal Powders Corporation

JPMA Secretariat

❒Mr. Yusuke Watanuki (Deputy Secretary General)
General Assembly, Technical Committees, Events, Web, Publication
❒Ms. Tokie Sakamoto (Assistant section chief)
Accountant and General affairs
❒Ms. Naomi Enomoto (Staff)
Statistics, Events, General affairs

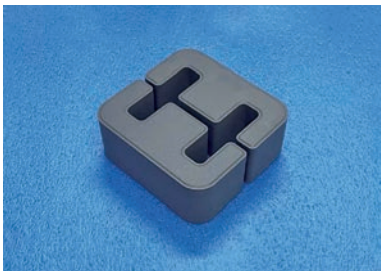
Activities of Committees

Selection Committee for Award Prize

Number of Committee Members: 14 persons

Chairman
Mr. Masashi Kikuchi
(PORITE CORPORATION)
New Chairman

*Selection Committee for JPMA Award



NEW DESIGN
Practical Application of High Frequency & High Strength Reactor Core
FINE SINTER CO., LTD.

Committee for Administration

Number of Committee Members: 18 persons

Sub-Committee for General Affairs

Number of Committee Members: 8 persons

Chairman:
Mr. Toshitaka Masumoto
(FUKUDA METAL FOIL & POWDER CO., LTD.)
Commission from 2022

*Planning and operating of “PM information Exchange Meeting” in March.
*Publication of the report “Analysis of investigation results of sintered parts demand structure 2022” in June.
*Edition of the Brochure “2022 JPMA Annual Report (English)” in May and “2022 JPMA Annual Report (Japanese)” in July.
*Planning and operating of the PR meeting “JPMA Awards Special Session” at JSPM Spring in May.
*Planning and operating of “26th Metal Powder and Equipment PR Meeting” and “41th Case Studies on Improving Production Efficiency Online Meeting” in November.
*Progress confirmation of "New Project Committee".

Sub-Committee for Public Relations

Number of Committee Members: 8 persons

Chairman:
Mr. Takahisa Matsumoto
(DIAMET CORPORATION)
New Chairman

*Planning and operating of “11th Human resources development seminar” in July.
*Publication of JPMA News “Funmatsu Yakin” (No413-416). 414 to electronic publication
*Planning and operating of "2nd PM Education Basic Course" in September.
*Planning and operating of WORLD PM2024 PR at APMA2023Gyeongji in November.
*Deliberation of PR of JPMA Website. (New Project)

Technical Committee for Sintered Parts

Number of Committee Members: 8 persons

Chairman
Mr. Kenichi Kato
(DIAMET CORPORATION)
Commission from 2022

*Discussion of the matter for ISO/TC119, SC3 and SC5.
*Deliberation of Measurement of surface roughness.
*Deliberation of the ideal sintering factory to achieve carbon neutrality in 2050. (New Project)

Sub-Committee for Sintered Bearings

Number of Committee Members: 3 persons

Chairman
Mr. Tomonori Yamashita
(NTN Advanced Materials Corporation)
Commission from 2020

*Deliberation of standardization of the full filling rate.
*Website Update for application example of Sintered Bearings.
*Website Update for electrification example of Sintered Bearings. (New Project)

Technical Committee for Press Machines

Number of Committee Members: 5 persons

Chairman
Mr. Junitiro Muto
(KOHTAKI PRECISION MACHINE CO., LTD.)
Commission from 2020

*Exchange on Information for defect cases of Press.
*Introduction for function of Press Machines
*Exchange on Information for newfangled Press Machines.
*Deliberation of Energy saving of Press Machines. (New Project)

Technical Committee for Metal Powders

Number of Committee Members: 13 persons

Chairman
Mr. Tetsuya Sawayama
(KOBE STEEL, LTD.)
Commission from 2020

*Discussion of matters for ISO/TC119, SC2 and SC5.
*Deliberation of filling property for Metal powders
*Introduction of topics about “Metal Powder” by the Committee members and exchange of views mutually.
*Revision of JIS Z 2500.
*Introduction of carbon neutral activity from member companies. (New Project)

Committee for Metal Injection Molding

Number of Committee Members: 14 persons

Chairman
Dr. Hideki Nakayama
(CASTEM CO., LTD.)
Commission from 2018

*Investigation of the Japanese MIM market.
*Planning and operating of "1st MIM Education Basic Course"
*Planning and operating of MIM PR for 9th Metal Japan EXPO. (New Project)

Marketing Committee

Number of Committee Members: 13 persons

Chairman
Mr. Toshitaka Igarashi
(FINE SINTER CO., LTD.)
Commission from 2022

*Survey of non-automotive market for PM applications. (New Project)

Committee for International Standardizations

Number of Committee Members: 6 persons

Chairman
Mr. Yuji Maeda
(FINE SINTER CO., LTD.)
Commission from 2022

*Attendance of 2023 ISO/TC119 Meeting
*Discussion of related matters for TC119, SC2, SC3 and SC5.

Committee for Environment

Number of Committee Members: 4 persons

Chairman
Mr. Kazunori Hattori
(Sumitomo Electric Industries, Ltd.)
Commission from 2018

*Investigation of 2022 follow-up survey for “Voluntary Action Plan for Environment of PM Industry”.
*Introduction of Case Studies of “CO_2 Emissions Reduction”, “Waste Product Reduction” and “KANKYO HIYARI”.
*Selection of the “Environment Awards”.
*Introduction of carbon neutral activity from member companies. (New Project)

Events and International Communications

19, January

Gathering of 2023 New Year Greeting and Ceremony of Awarding Various Honors in 2022.

3, March

2nd MIM Education Basic Course. (Online)

10, March

The 18th PM Information Exchange Meeting.

19, May

2023 JPMA General Assembly.

The 2023 Activity Plans and Budget of JPMA.

6-8, June

JPMA Special Session at the JSPM Spring Meeting.

23, June

Tour of Committee for Administration.

FUKUDA METAL FOIL & POWDER CO., LTD.

Kyoto Factory

1, July

16th APMA Board Meeting. (Written Resolution)

7, July

11th Human resources development seminar.

13, 20, September

2nd P/M Education Basic Course. (Online)

4-6, October

10th Metal Japan EXPO, MIM PR Seminar.

26, October

2023 JPMA Fall General Assembly.

Announcement of 2023 JPMA Awards.

15, November

The 41th Case Studies of Production Efficiency Improvement Meeting and the 26th Metal Powder and Equipment PR Meeting. (Online)

27-30, November

APMA2023 Gyeongju.

28, November

17th APMA Board Meeting.

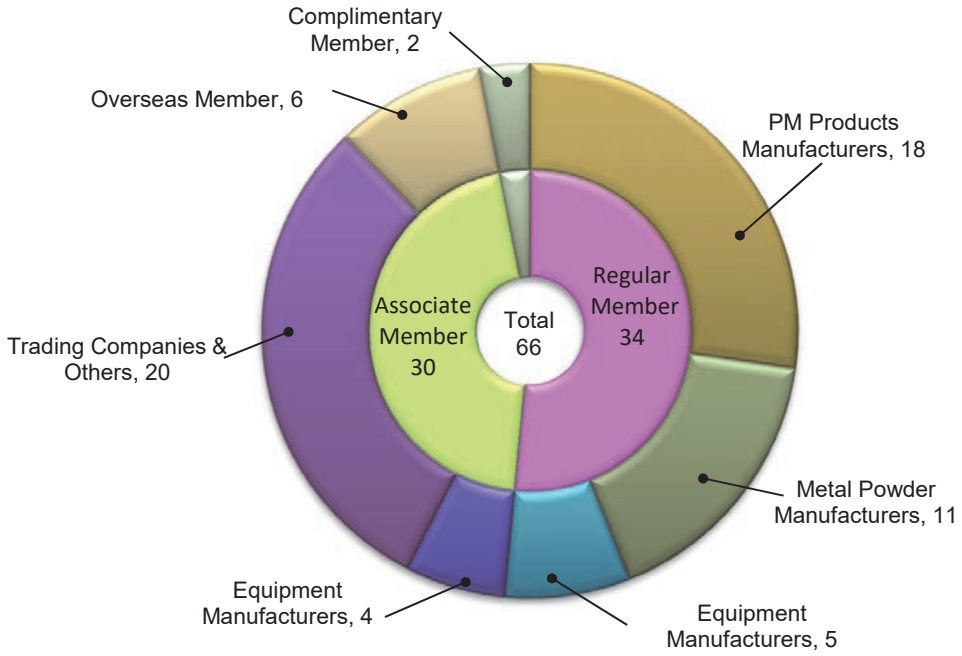
JPMA Publications

The 44th Investigation Collection Results of Sintered Parts Demand Structure.

JPMA Report, 2022 (English and Japanese).

JPMA News “Funmatsu Yakin” (No413-416).

JPMA Membership



2023 New Members

Regular Member

Oriental Chain Mfg. Co., Ltd.

Associate Member

Kobayashi Industry Co., Ltd.

SANKI SEIKO CO., LTD.

Shinohara Press Service Co., Ltd.

Statistics of Japan

Production of PM Products in Japan

Fig.1 shows the production volume change of Machine Parts and Bearings for the period from 2014 through 2023.

In 2023, Machine Parts volume was 67,997 ton, 2.5% decrease from the previous year. Bearings volume was 4,479 ton, 4.4% decrease from the previous year.

As the other products, Friction Materials volume was 796 ton, 14.1% decrease from the previous year. Electric Contacts volume was 71 ton, 20.2% increase from the previous year.

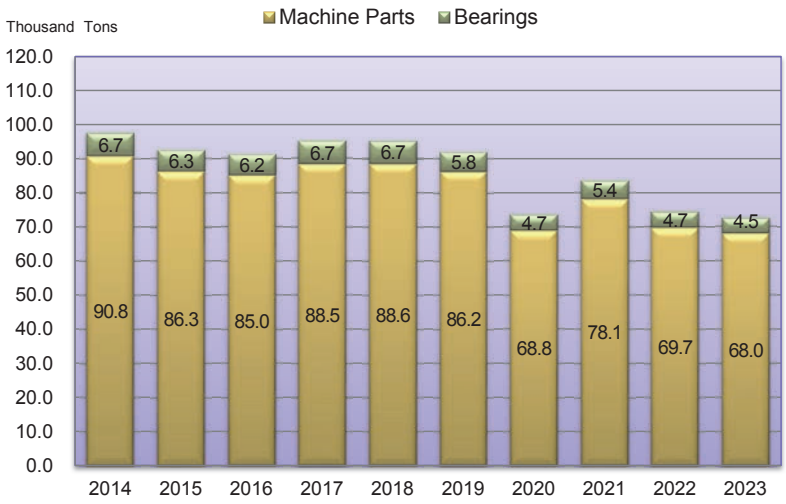


Fig.1 Production of Machine Parts and Bearings (Calendar Year) (Source: METI)

Machine Parts, Bearings and MIM Parts

Fig.2 shows the analysis of demand for Machine parts and Bearings for the period from 2014 through 2023.

In 2023, Machine Parts Production volume for Vehicles was 63,711 ton, 1.6% decrease from the previous year.

For vehicles which are the major demanders of Machine Parts, the production volume was sluggish from 1Q until 3Q by the effect of the semiconductor supply shortage, however, from 4Q the production volume was recovered caused by recovering the demand along with eliminating supply shortage.

On the trend of the demand items the parts for ICE vehicles were decreased, while those for electric vehicles (e.g. Reactor Core) were increased. It is predicted that this tendency will continue in the future.

For industrial and electric machines the production volume of Machine Parts were decreased because of significant decrease in demand and inventory adjustment due to the economic recession in the developing countries.

Production volume of Bearings for Vehicles was 3,205 ton, 1.0% decrease from the previous year.

The demand for Bearings was recovered along with eliminating semiconductor supply shortage similarly to Machine Parts. The weight of the individual bearing has been on the decreasing trend along with the miniaturization of automotive motor used, nevertheless, the production volume remained only a slight decrease. It was presumed that this was caused by increasing adoption of the bearings by PM. To satisfy customer requirements for miniaturization and noise reduction of bearings the manufacturers have been focusing on the developments of materials, manufacturing processes and impregnated oils.

For MIM Parts a decrease in the order for equipment parts could be seen caused by the economic

recession in the developing countries, however, in the demanders other than that the difference in tendency between the manufacturers could be seen. Across the entire MIM it was presumed that the sales level same as previous year was accomplished.

The price pass-through by leadership of the government has been proceeding against the global rising costs of raw materials and fuels including PM industry, and so it is predicted that the improvement of profitability is proceeding from now on.

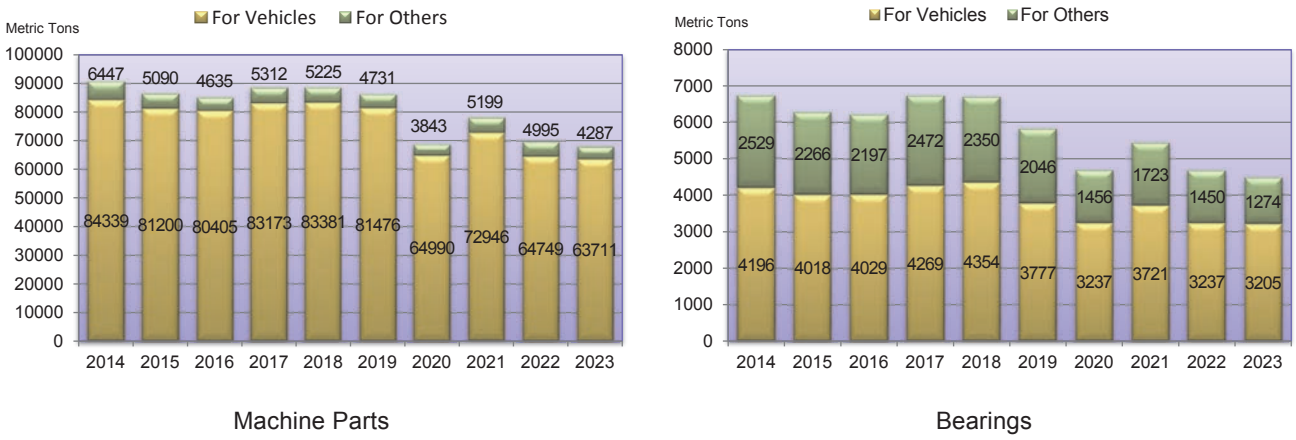


Fig.2 Analysis of Demand for Machine Parts and Bearings (Calendar Year) (Source: METI)

Fig.3 shows the use breakdown of Machine Parts and Bearings in vehicle in 2022 based on the demand structure survey by JPMA.

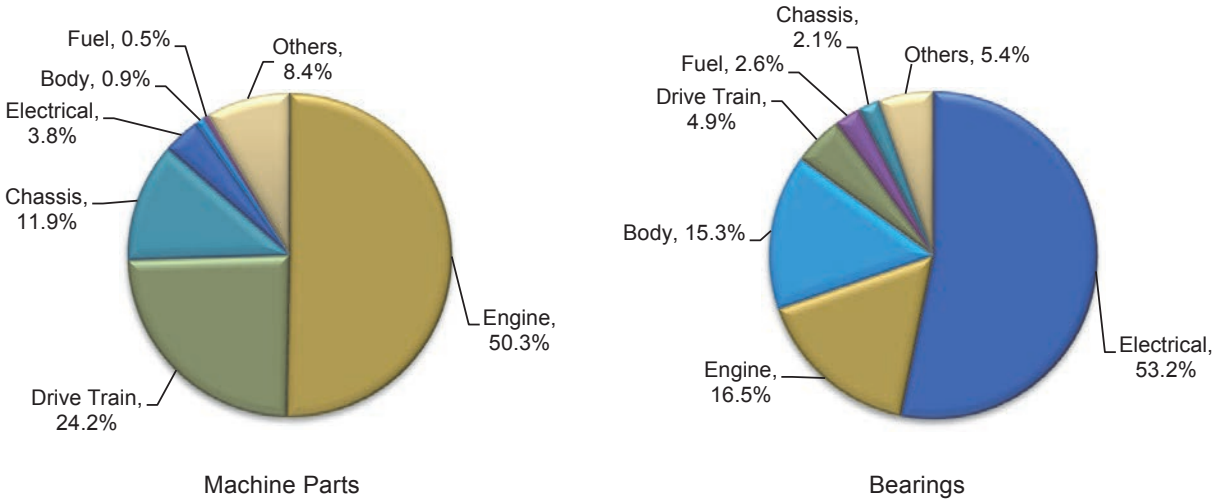


Fig.3 Breakdown of Machine Parts and Bearings for Vehicle (2022) (Source: JPMA)

Fig.4 shows the weight of sintered parts calculated for one car and the car production in Japan for the period from 2013 through 2022.

The weight of sintered parts calculated for one car in 2022 was 7.7kg in Japan, 15.9kg in U.S. and 8.7kg in Europe.

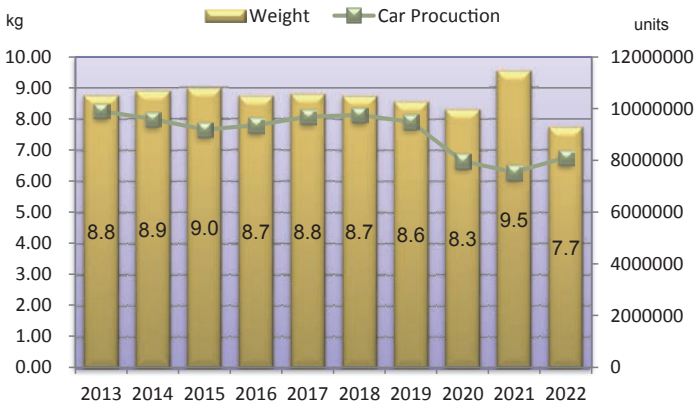


Fig.4 Weight for sintered parts calculated for one car (Source JPMA and JAMA)

Production of PM Powders in Japan

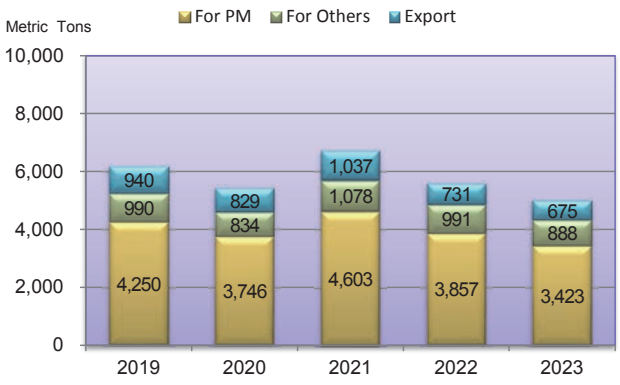
Fig.5 shows the Shipment of Iron and Copper Powders for the period from 2019 through 2023 and Shipment of Other Powders for the period from 2018 through 2022.

Along with a decrease in the demand for Machine Parts and Bearings, that for Iron and Copper Powders was decreased similarly.

Especially the shipment of Copper Powders was the lowest level since 1977. It was presumed that this was caused by reducing copper content in the bearings and increasing adoption of iron-base raw material powders. While, the adoption for AM and MIM is expected as new applications.

We have no date of Stainless Powder and MIM Powder in 2023, however, it was predicted that the shipment of Stainless Powder was decreased and that of MIM Powder was increased.

Shipment of Iron Powders (Calendar Year)



Shipment of Copper Powders (Calendar Year)

Shipment of Other Powders (Fiscal Year)

Fig.5 Shipment of Metal Powders (Source JPMA)

JPMA Awards

Personal Prize

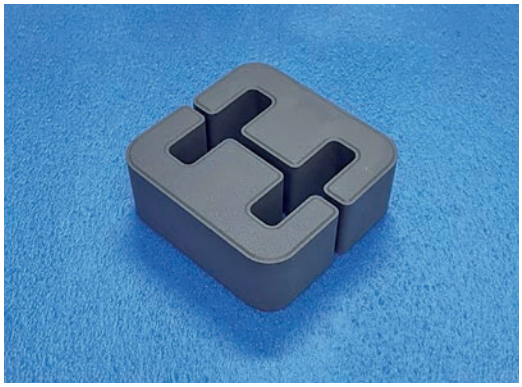
Mr. Yoichi Inoue
Former FINE SINTER CO., LTD.

2013-2023
Chairman and Permanent Board Member

Development Prize

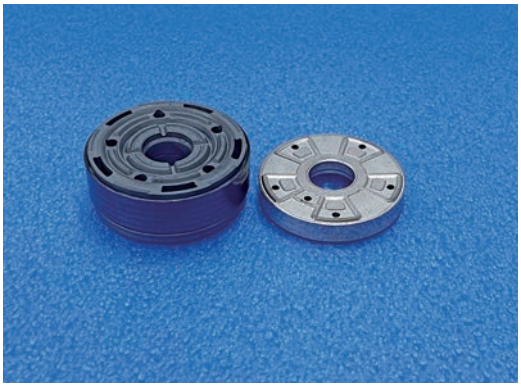
New Design

Practical Application of High Frequency & High Strength Reactor Core



FINE SINTER CO., LTD.／Daido Steel Co., Ltd.

Development of high-precision parts for new mechanism semi-active suspension

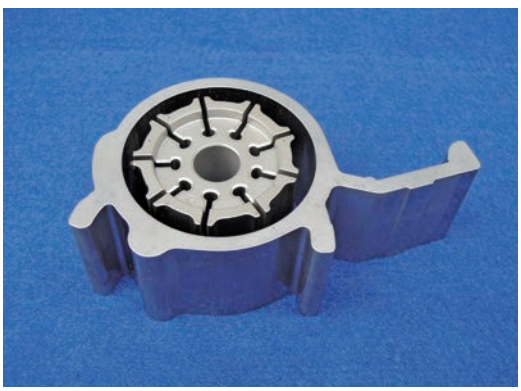


FINE SINTER CO., LTD.

Oil-impregnated bearing unit for CPAP equipment that achieves low sliding loss at high speeds

Porite Corporation

Development of Long/complex Shape Rotor and Slide for Variable Displacement Vane Pumps



SUMITOMO ELECTRIC INDUSTRIES, LTD.

New Powders

Aluminum bronze powder for powder metallurgy

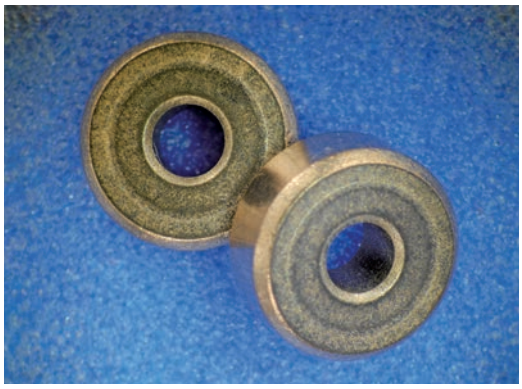
FUKUDA METAL FOIL & POWDER CO., LTD.

Effort Prize

Sintered parking parts for electric vehicles

SUMITOMO ELECTRIC INDUSTRIES, LTD.

Oil-impregnated Sintered Bearings with Excellent Wear Resistance by Applying Density Gradient



Porite Corporation

Prize for Distinguished Service of the Committee Activities

Mr. Kazuhiko Suganaga
PT. Sumiden Sintered Components Indonesia
2006-2023
Member of Committee for Press Machines
Member of Committee for International Standardizations

Mr. Toru Moriya
Former FINE SINTER CO., LTD.
1998-2023
Member of Committee for Press Machines
Chairman and member of Committee for Sintered Parts

Mr. Kazunori Kato
Former FINE SINTER CO., LTD.
2015-2023
Chairman and member of Committee for Administration
Chairman and member of Sub-Committee for General Affairs
Chairman and member of Sub-Committee for Public Relations

Mr. Noboru Shimada
PORITE CORPORATION
2001-2023
Chairman and member of Committee for Sintered Parts
Chairman and member of Committee
for International Standardizations
Member of Marketing Committee
Member of Committee for Environment

Recognition of Superior Employees

2023 prizewinner numbered 11 persons
(9 member companies)

Environment Prize

Reduction of CO_2 basic unit
FINE SINTER Co., LTD.
Shiga Plant

Reduction for total waste basic unit
FUKUI SINTER CO., LTD.
Fukushima Plant

PM Production in Asia

PM Production (Source JPMA, PMAI, KPMI, TPMA and CMPMA)

(Metric Tons)

AREA		2021	2022	2023	23/22(%)
Japan	Iron-base	81,137	72,363	70,311	97.2
	Copper-base	2,453	2,068	2,165	104.7
	Total	83,590	74,431	72,476	97.4
China	Iron-base	188,236	163,923	174,961	106.7
	Copper-base	13,539	12,580	14,665	116.6
	Total	201,775	176,503	189,626	107.4
Korea	*Iron-base	63,538	64,820	70,012	108.0
	Copper-base	872	566	580	102.5
	Total	64,410	65,386	70,592	108.0
Taiwan	Iron-base	31,000	26,000	19,000	73.1
	Copper-base	1,800	1,000	1,000	100.0
	Total	32,800	27,000	20,000	74.1
India	Iron-base	36,000	45,000	49,000	108.9
	Copper-base	9,800	12,000	13,000	108.3
	Total	45,800	57,000	62,000	108.8
Malaysia	Iron-base	3,354	3,342	2,899	86.7
	Copper-base	132	151	174	115.2
	Total	3,486	3,493	3,073	88.0
Thailand	Iron-base	16,036	14,208	13,411	94.4
	Copper-base	60	41	40	97.6
	Total	16,096	14,249	13,451	94.4
Indonesia	Iron-base	5,433	5,825	5,584	95.9
	Copper-base	0	0	0	—
	Total	5,433	5,825	5,584	95.9
Other areas	Iron-base	1,337	1,077	922	85.6
	Copper-base	370	214	170	79.4
	Total	1,707	1,291	1,092	84.6
Total	Iron-base	426,071	396,558	406,100	102.4
	Copper-base	29,026	28,620	31,794	111.1
	Total	455,097	425,178	437,894	103.0

*Included “Others”