



JAPAN POWDER
METALLURGY ASSOCIATION

2021

JPMA Annual Report

Year ended December 31, 2021

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Executive Director Report



Yoshio Uetsuki, Executive Director

Dear Friends,

Your heartfelt support for our JPMA activities would be much appreciated. This annual report about the year 2021 is summarized on considering your support and cooperation with us.

During the last year, Japan suffered from COVID-19 like the previous year 2020. Though many countries in the world are even now suffering COVID-19, some of them show tendencies to remove restrictions against COVID-19. However the way for the whole world to be freed from COVID-19 disaster is still not clear. We do hope the time of the COVID-19 to be treated like a mere flu to come soon.

As for global warming countermeasures, more than 120 countries in the world commenced their activities towards the goal of “2050 Carbon Neutral”. It is important for Japan and our Powder Metallurgy Fields to progress substantially necessary works without missing riding on the global tide. Accordingly adequate reactions for unprecedented revolution and its related activities should be accelerated.

<2021 Topics>

During the year of 2021, whole committees meeting and events of JPMA's main activities were held under on-line system. The New Year Party and Various Prize Giving Ceremony usually to be held in January were cancelled off, and the General Meeting in May was held under on-line system.

The JPMA Prize involves New Product Prize and PM Field Contribution Prize, which are founded in 1979 and counts 43rd in 2021. The New Product Prize were given to 6 New Designs, 1 New Material and 1 Encouragement prize. The Environmental Prize were given to NAPAC CO., Ltd for the largest CO₂ reduction rate and NIPPON PISTON RING CO., LTD, TOCHIGI FACTORY for the largest waste reduction Rate. The JPMA continues following up CO₂ and waste reducing activities in the future, in order to activating movements related to SDGs.

Additionally, for 65th Anniversary of JPMA Foundation, the Overseas Product Award for the Product produced overseas by JPMA member was newly founded and 3 items were selected for the Award. In December, the JPMA supported 3 MIM production companies to show jointly their products on 8th Metal Japan EXPO, where the Seminar of MIM related technologies was held successfully with full of attendants.

The event specially to be pointed out was a new project foundation for the sake of reaction with Carbon Neutral Movement by PM Industries. It was a plan for assuming “Model PM enterprises in the year of 2030 and 2050”. Also, we are planning to start research of movement for mobile electrification, energy saving, and LCA (Life-Cycle Assessment), and to announce Environmental Superiorities of PM products to users in the future.

As for interchange with overseas organizations, an APMA (Asian Powder Metallurgy Association) Conference planned to hold in Korea was regrettably stopped due to COVID-19, and therefore, the APMA Board Meeting was held on paper. APMA President Mr. C. L. Chu performed a chairman and 9 organization of 6 area of Taiwan, Korea, China, India, Thai and Japan participated then. The agenda was about the 2022 World Conference Lyon, France, the 2023 Asia Conference Korea, and the 2024 World Conference Yokohama, Japan, and decided related cooperation and necessary supports to be provided among APMA members. JPMA

started the preparation for the World PM 2024 Pacifico Yokohama to be held after 12 years in Japan. We do hope World PM Congress & Exhibition and APMA Congress in Asia to be continuously and favorably held under the cooperation by whole PM related Member Countries.

<Japanese PM Products in 2021>

The Japanese GDP growth rate came down during Jan-March by 3.9% than the previous quarter, recovered during April-June by 1.9% ditto, showed much down during July-Sept by 3.6% ditto, influenced by automobile production reduction due to insufficient supply of semiconductors, parts and so on due to COVID-19, and then recovered substantially during Oct-Dec by 4.6% ditto, because of release of the declaration of the state of emergency against COVID-19 and rapid recovery of personal consumption. As the result, the GDP growth rate for all year round 2021 was 2.5%.

In 2022, though economic activities would be expected to be recovered gradually, its normalizing pace might be continuously hanging in the balance with COVID-19.

Under these economic conditions, local automobile production quantity including buses and trucks of key industries was 7,840 thousand, which showed minus 2.7% than the previous year (source: Japan

Automobile Industries Association Statistics), which was of the lowest level for 45 years since 1976, and its number was lower than 8 million, that was the lowest in last 12 years, and came down continuously during 3 years.

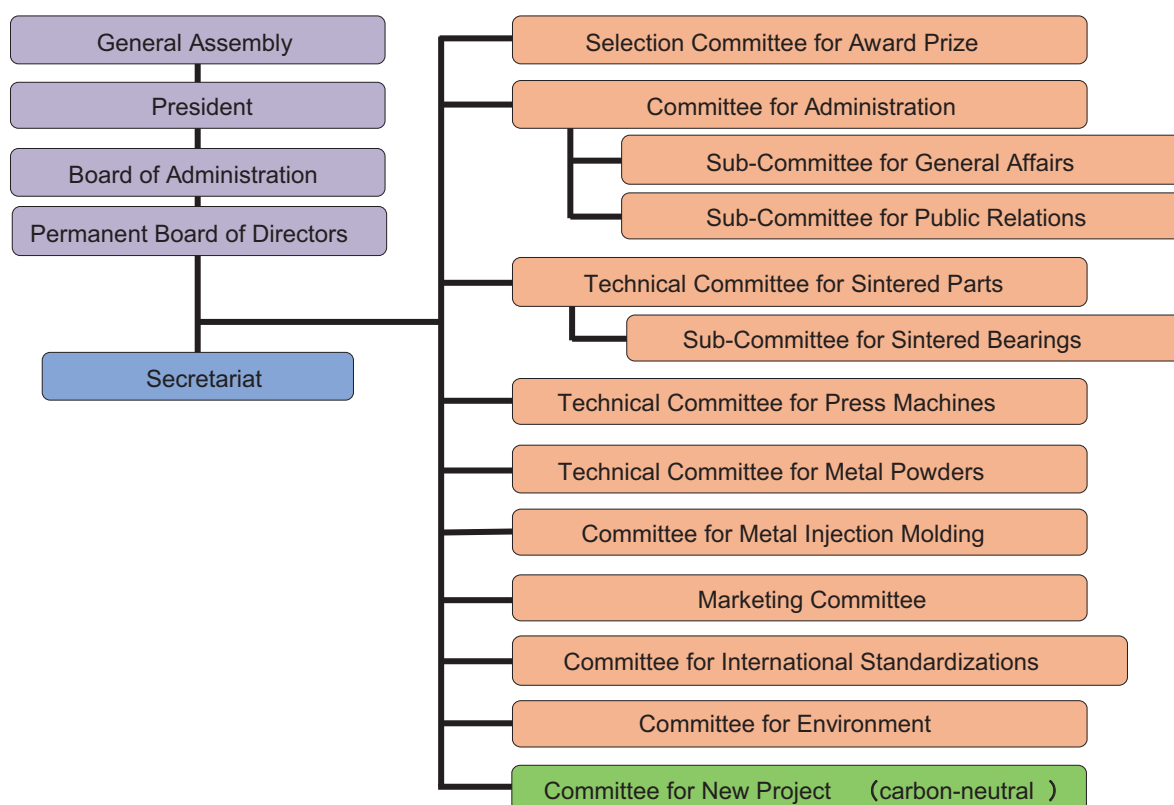
As for the PM machine parts, automobile parts sharing more than 90% came down substantially, but industrial machine parts increased substantially, therefore 2021 production became 78.1 thousand tons, 13.5% more than previous year, and production amount was 113 billion Yen. However, the 2021 product was 9.3% less than that of 2019, which did not show recovery up to the condition before COVID-19 Infection.

Concerning PM bearing alloy, 2021 production increased up to 5.4 thousand tons, 16.0% more than that of previous year, 17.4 billion Yen, 21.9% ditto, however 6.5% less when comparing 2019 production, which did not recover up to the level before COVID-19 Infection, as well.

The JPMA strongly progress activities for promoting PM technologies and developments, coping with Carbon Neutral, education of manpower, and cooperation with overseas PM fields, for the sake of PM field promotion.

We thank you very much for kind cooperation of APMA, MPIF and EPMA, hoping further supports for JPMA.

Organization of JPMA



Board Members

President

☐ Mr. Nobuhiro Hashimoto

President

Sumitomo Electric Industries, Ltd.

Sinterwerke Herne GmbH / Sinterwerke Grenchen AG



Executive Director

Mr. Yoshio Uetsuki

Japan Powder Metallurgy Association

Permanent Board Members

Mr. Hiroshi Ii

DIAMET CORPORATION

Mr. Yoichi Inoue

FINE SINTER CO., LTD.

Mr. Masashi Kikuchi

PORITE CORPORATION

Mr. Hiroyasu Narukawa

KOBE STEEL, LTD.

Mr. Syuzo Sonoda

FUKUDA METAL FOIL & POWDER CO., LTD.

Mr. Carl-Gustav Eklund

Höganäs Japan K.K.

Board Members

Mr. Junichi Takahashi

IWAKI DIECAST Co., Ltd.

Mr. Yoshitake Nakashima

NTN Advanced Materials Corporation

Mr. Takashi Suzuki

NAPAC CO., LTD.

Mr. Masayoshi Nishimura

FUKUI SINTER CO., LTD.

Mr. Shoichiro Tokumaru

JFE Steel Corporation

Mr. Tetusya Shimizui

Daido Steel Co., Ltd.

Mr. Atsushi Nagano

Dowa Electronics Materials Co., Ltd.

Mr. Jiro Bando

Nippon Atomized Metal Powders Corporation

Mr. Naoya Takahashi

Mitsubishi Materials Techno Corporation

Auditor

Mr. Yuichi Miyagawa

Mitsubishi Materials Techno Corporation

Mr. Yasushi Mori

Nippon Atomized Metal Powders Corporation

JPMA Secretariat

Mr. Yusuke Watanuki (Manager)

General Assembly, Technical Committees, Events, Web, Publication

Ms. Tokie Sakamoto (Supervisor)

Accountant and General affairs

Ms. Aoi Yamanaka (Supervisor)

Statistics, Events, General affairs, Web

Activities of Committees

Selection Committee

for Award Prize

Number of Committee Members: 15 persons



Chairman: Mr. Shuzo Sonoda
(FUKUDA METAL FOIL & POWDER CO., LTD.)
New Chairman

*Selection Committee for JPMA Award (Development Prize)



NEW DESIGN

Development of parking part of transmission for PHEVs
Sumitomo Electric Industries, Ltd.

Committee for Administration

Number of Committee Members: 20 persons

Sub-Committee for General Affairs

Number of Committee Members: 7 persons



Chairman: Kosaku Fujita
(DIAMET CORPORATION)
New Chairman

*Publication of the report "Analysis of investigation results of sintered parts demand structure 2020" in June.

*Edition of the Brochure "2020 JPMA Annual Report (English)" in May and "2020 JPMA Annual Report (Japanese)" in July.

*Planning and operating of the PR meeting "JPMA Awards Special Session" at JSPM Spring Meeting in June.

*Planning and operating of "24th Metal Powder and Equipment PR Meeting" and "39th Case Studies on Improving Production Efficiency Online Meeting" in November.

*Planning and operating of "PM information Exchange Online Meeting".

*Planning of "New Project Committee"

Sub-Committee

for Public Relations

Number of Committee Members: 8 persons



Chairman: Mr. Chihiro Takata
(Sumitomo Electric Industries, Ltd.)
Commission from 2020

- *Planning and operating of "9th Human resources development online seminar" in July.
- *Publication of JPMA News "Funmatsu Yakin" (No405-408).
- *Planning of "PM Education Basic Course"
- *Planning of WORLD PM2024 PR
- *Deliberation of PR of JPMA Website. (New Project)

Technical Committee

for Sintered Parts

Number of Committee Members: 8 persons



Chairman: Mr. Kiyotaka Inoue
(SUMITOMO ELECTRIC
SINTERED ALLOY LTD.)
 Commission from 2020

- *Discussion of the matter for ISO/TC119, SC3 and SC5.
- *Deliberation of Measurement of surface roughness.
- *Introduction of energy saving equipment. (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.
- *Deliberation of update of Bearings Website.
- *Deliberation of PR of sintered bearings on Website. (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.
- *Exchange on Information for newfangled Press Machines.
- *Deliberation of the simple precision inspection of 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.
 - *Deliberation of JIS Z 2500, 2510 and JPMA P13 revision.
 - *Introduction of carbon neutral activity from member companies. (New Project)
-

Committee for

Metal Injection Molding

Number of Committee Members: 13 persons



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

- *Investigation of the Japanese MIM market.
 - *Planning of "MIM Education Basic Course"
 - *Standardization of JIS Z 2551.
 - *Planning and operating of MIM PR for 8th Metal Japan EXPO. (New Project)
 - *Information Exchange meeting of MIM and Additive Manufacturing (BJT).
-

Marketing Committee

Number of Committee Members: 13 persons



Chairman: Mr. Shuhei Nakamura
(DIAMET CORPORATION)
Commission from 2020

- *Deliberation of update of the P/M Roadmap.
 - *Survey of carbon neutral trends in automotive manufacturers. (New Project)
-

Committee for International Standardizations

Number of Committee Members: 6 persons



Chairman: Mr. Noboru Shimada
(PORITE CORPORATION)
Commission from 2017

*Attendance of 2021 ISO/TC119 Online 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
SINTERED ALLOY LTD.)
Commission from 2018

*Investigation of 2020 follow-up survey for “Voluntary Action Plan for Environment of PM Industry”.

*Introduction of Case Studies of “CO₂ Emissions Reduction”, “Waste Product Reduction” and “KANKYO HIYARI”.

*Selection of the “Environment Awards”.

*Introduction of carbon neutral activity from member companies. (New Project)

JPMA Events and International Communications

21, January Cancellation

Gathering of 2021 New Year Greeting and Ceremony of Awarding Various Honors in 2020.

12, March Cancellation

Joint Meeting by the three technical committees

12, March

The 16th PM Information Exchange Meeting. (Online)

26, March

The 1st the PM Joint Job Information Fair. (Online)

14, April

The 2nd Joint result presentation of Committee. (Online)

18, May

2021 JPMA General Assembly. (Online)

The 2021 Activity Plans and Budget of JPMA. (Online)

1-3, June

JPMA Special Session at the JSPM Online Spring Meeting.

10, June Cancellation

Tour of Committee for Administration.

29, September

14th APMA Board Meeting. (Written Resolution)

9, July

9th Human resources development seminar. (Online)

7, October

Tour of Technical Committee for Sintered Parts. (Online)

21, October

2021 JPMA Fall General Assembly. (Online)

Announcement of 2021 JPMA Awards. (Online)

17, November

The 39th Case Studies of Production Efficiency Improvement Meeting and the 24th Metal Powder and Equipment PR Meeting. (Online)

8-10, December

8th Metal Japan EXPO.

MIM PR Seminar.

JPMA Publications

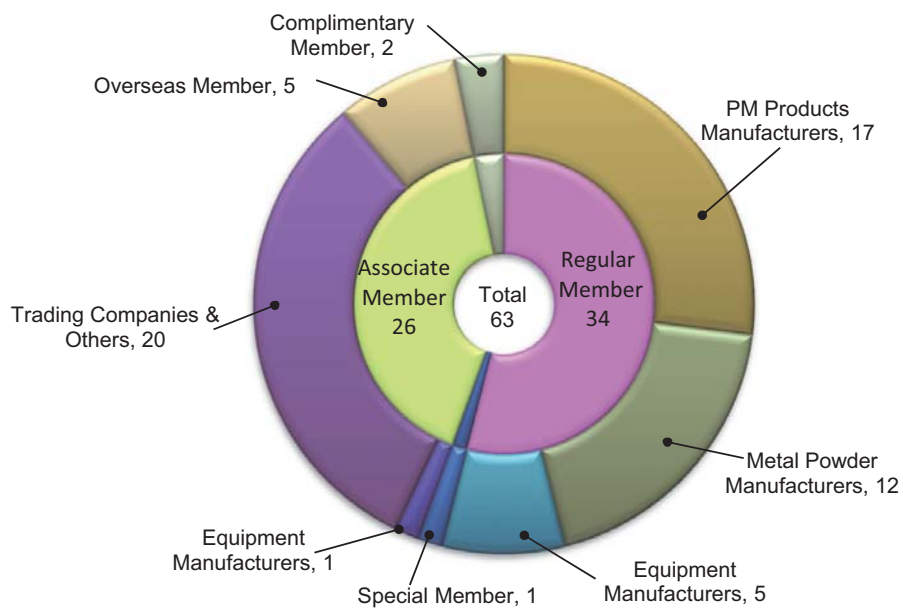
The 42th Investigation Collection Results of Sintered Parts Demand Structure.

JPMA Report, 2020 (English and Japanese).

JPMA News "Funmatsu Yakin" (No405-408).

JPMA Standard (JPMA M 05, Sintered metal materials, excluding hardmetals - Unnotched impact test piece)

JPMA Membership



2021 New Members

Associate Member

TAIWAN YOSHIZUKA INDUSTRIES CO., LTD.



Statistics of Japan

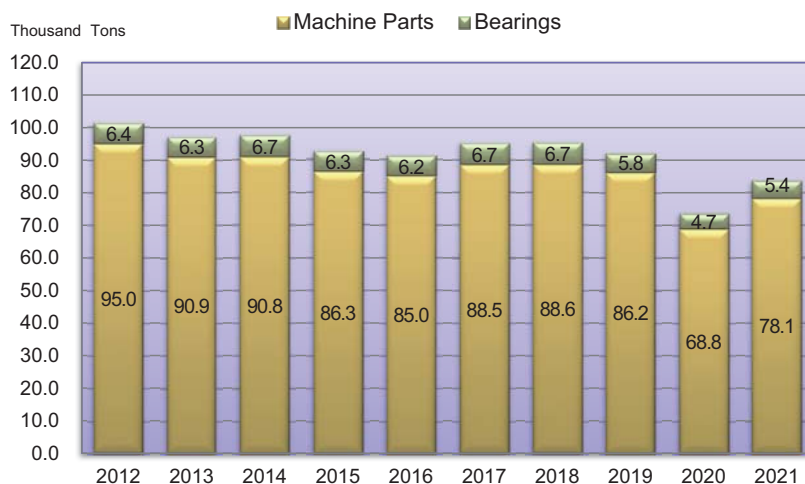
Production of PM Products in Japan

Fig1 shows the production volume change of Machine Parts and Bearings for the period from 2012 through 2021.

In 2021, Machine Parts volume was 78,145 ton, 13.5% increase from the previous year. Bearings volume was 5,445 ton, 16.0% increase from the previous year. Especially, Industrial Machine Parts were good condition, because Robots, Construction Machines & Machine Tools were good condition.

As the other products, Friction Materials volume was 881 ton, 50.9% increase from the previous year. Electric Contacts volume was 91 ton, 33.8% increase from the previous year. Even under COVID-19, demands for Medical Appliance of MIM Parts were good condition. For Industrial Machine, demands for Semi-conductor Parts were increased drastically. And even in 2022, that production will keep high level continuously.

Fig1. Production of Machine Parts and Bearings (Calendar Year) (Source: METI)



Machine Parts and Bearings

Fig2 shows the analysis of demand for Machine parts and Bearings for the period from 2012 through 2021.

In 2021, Machine Parts Production volume for Vehicles was 72,946 ton, 12.2% increase from the previous year.

For Machine Parts, Parts for Vehicles were recovered drastically from the decrease of last year. But in the latter half of the year, because of the decrease of supply of old generation type semi-conductor, the production control happened and the demand was decreased. In the future, because of COVID-19, Ukraine conflict and the energy price increase, the time for normalization will be needed.

For the trend of Parts, with the change from ICE to HEV/PHEV, the demand of Reactor Core for Inverter will be increased.

Production volume of Bearings for Vehicles was 3,721 ton, 15.0% increase from the previous year.

Production of Bearings were recovered drastically because of the demand increase of Electric Components and Parts for Supercharger for overseas export. But same as Machine Parts, influence of supply decrease of semi-conductor was occurred.

Fig2. Analysis of Demand for Machine Parts and Bearings (Calendar Year) (Source: METI)

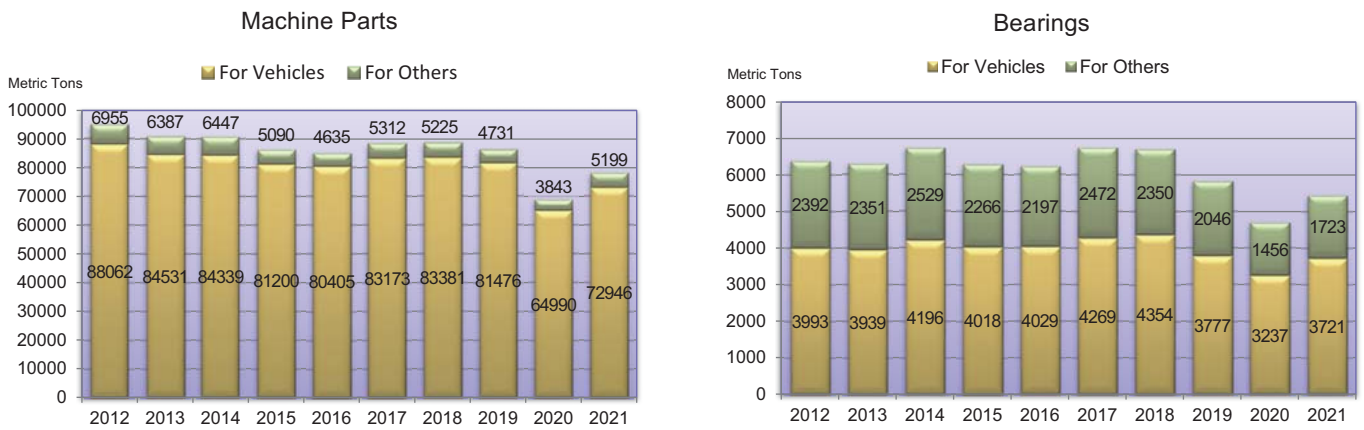


Fig3 shows the use breakdown of Machine Parts and Bearings in vehicle in 2020 based on the demand structure survey by JPMA.

Fig3. Breakdown of Machine Parts and Bearings for Vehicles (2020) (Source: JPMA)

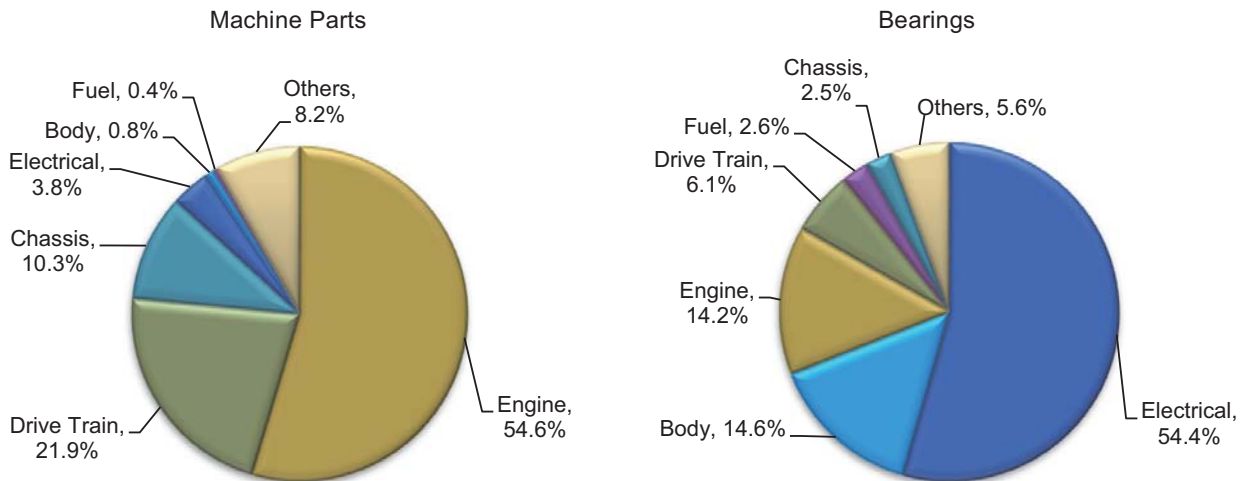
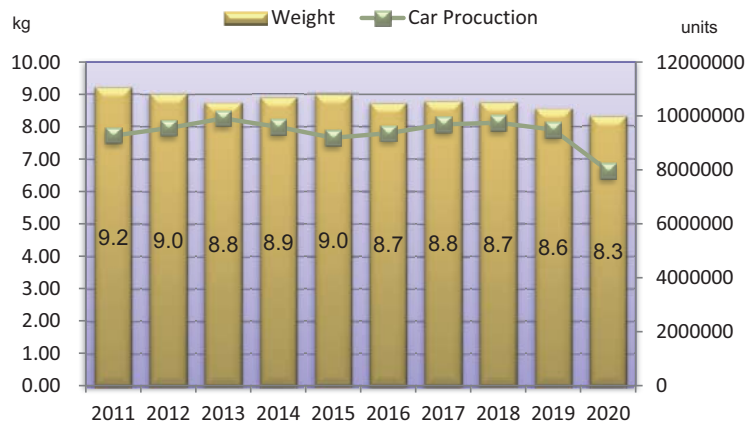


Fig4 shows the weight of sintered parts calculated for one car and the car production in Japan for the period from 2011 through 2020.

The weight of sintered parts calculated for one car in 2020 was 8.3kg in Japan, 16.8kg in U.S. and 8.7kg in Europe.

Fig4. Weight for sintered parts calculated for one motor car (Source JPMA and JAMA)

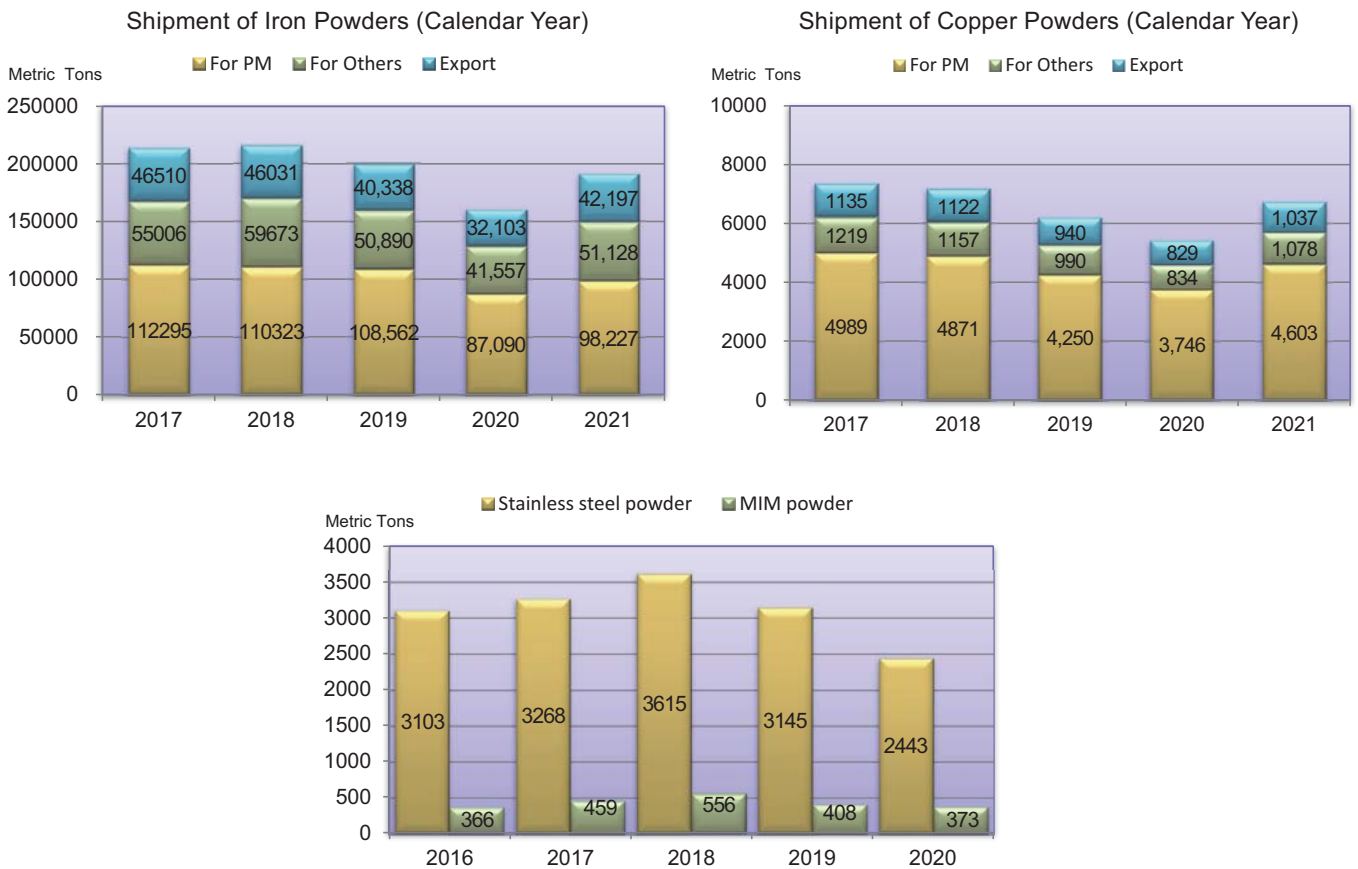


Production of PM Powders in Japan

Fig5 shows the Shipment of Iron and Copper Powders for the period from 2017 through 2021 and Shipment of Other Powders for the period from 2016 through 2020.

By the demand increase of Machine Parts and bearings, the production of all powders were increased. Especially, because of demand increase of foreign countries, Iron Powder were increased 31.4% from the previous year. Because of COVID-19, Powders for MIM Parts were decreased in 2020 but in 2021, that will be recovered to the level of 2018.

Fig.5 Shipment of Metal Powders (Source JPMA)



JPMA Awards

Development Prize

New Design

Development of parking part of transmission for PHEVs



SUMITOMO ELECTRIC INDUSTRIES, LTD.

High efficiency electric oil pump parts for HEVs clutch engagement (high pressure application)



SUMITOMO ELECTRIC INDUSTRIES, LTD.

Development of button parts for shale gas drilling tool



Porite Corporation

Development of Soft Magnetic Powder Cores for Axial Gap Motors



SUMITOMO ELECTRIC INDUSTRIES, LTD.

Development of Sprocket Drive for One-Motor Hybrid



FINE SINTER Co., LTD.

Sintered bearing for suction motor of robot vacuum cleaner



Porite Corporation

New Materials

Development of copper-based sintered alloy slider with low trolley wire wear



FINE SINTER Co., LTD.

Effort Prize

Adoption of sintered parts in EPB units for medium-heavy duty vehicles



FINE SINTER Co., LTD.

Prize for Distinguished Service of the Committee Activities

Mr. Sanpei Seki

Former Porite Corporation

2004-2020

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

Chairman and Member of Sub-Committee for Sintered Bearings

Chairman and Member of Committee for

International Standardizations



Mr. Katsuo Murakami

Former YOSHIZUKA INDUSTRIES CO., LTD.

2009-2021

Chairman and Member of Technical Committee for

Press Machines



Recognition of Superior Employees

2021 prizewinner numbered 12 persons

(8 member companies)

Environment Prize

Reduction of CO₂ basic unit

NAPAC Co., Ltd.

Headquarter and Plant

(Nagano Prefecture, Japan)



Reduction for total waste basic unit

NIPPON PISTON RING CO., LTD.

Tochigi Plant

(Tochigi Prefecture, Japan)



65th Anniversary JPMA Award

Development of metallic interconnector for SOFC (Solid Oxide Fuel Cell) stack



Porite TAIWAN CO., LTD.

Brazing connected CARRIER using molten copper material and induction hardening



Sumitomo Electric Sintered Components(T) Co., Ltd.

Achievement of the same quality at three overseas bases of sinter-brazing planetary carriers



Sumiden Powder Metallurgy (WUXI) Co.,Ltd..

PM Production in Asia

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

(Metric Tons)

| AREA | | 2019 | 2020 | 2021 | 21/20(%) |
|-----------|-------------|---------|---------|---------|----------|
| Japan | Iron-base | 89,239 | 71,467 | 81,137 | 113.5 |
| | Copper-base | 2,776 | 2,126 | 2,453 | 115.4 |
| | Total | 92,015 | 73,593 | 83,590 | 113.6 |
| China | Iron-base | 162,612 | 164,619 | 188,236 | 114.3 |
| | Copper-base | 10,780 | 11,268 | 13,539 | 120.2 |
| | Total | 173,392 | 175,887 | 201,775 | 114.7 |
| Korea | *Iron-base | 64,531 | 58,681 | 62,900 | 107.2 |
| | Copper-base | 673 | 1,118 | 1,510 | 135.1 |
| | Total | 65,204 | 59,799 | 64,410 | 107.7 |
| Taiwan | Iron-base | 30,630 | 30,700 | 31,000 | 101.0 |
| | Copper-base | 2,060 | 1,980 | 1,800 | 90.9 |
| | Total | 32,690 | 32,680 | 32,800 | 100.4 |
| India | Iron-base | 40,000 | 32,000 | 36,000 | 112.5 |
| | Copper-base | 10,200 | 8,500 | 9,800 | 115.3 |
| | Total | 50,200 | 40,500 | 45,800 | 113.1 |
| Malaysia | Iron-base | 3,920 | 3,063 | 3,354 | 109.5 |
| | Copper-base | 115 | 111 | 132 | 118.9 |
| | Total | 4,035 | 3,174 | 3,486 | 109.8 |
| Singapore | Iron-base | 1,442 | 1,105 | 1,337 | 121.0 |
| | Copper-base | 384 | 313 | 370 | 118.2 |
| | Total | 1,826 | 1,418 | 1,707 | 120.4 |
| Thailand | Iron-base | 18,434 | 13,514 | 16,036 | 118.7 |
| | Copper-base | 76 | 55 | 60 | 109.1 |
| | Total | 18,510 | 13,569 | 16,096 | 118.6 |
| Indonesia | Iron-base | 6,588 | 4,543 | 5,433 | 119.6 |
| | Copper-base | 111 | 62 | 0 | — |
| | Total | 6,699 | 4,605 | 5,433 | 118.0 |
| Total | Iron-base | 417,396 | 379,692 | 425,433 | 112.0 |
| | Copper-base | 27,175 | 25,533 | 29,664 | 116.2 |
| | Total | 444,571 | 405,225 | 455,097 | 112.3 |

*Included "Others"

