## Contents January – December, 2021

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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

- General Assembly
- President
- Board of Administration
- Permanent Board of Directors
- Secretariat

Selection Committee for Award Prize
- Committee for Administration
  - Sub-Committee for General Affairs
  - Sub-Committee for Public Relations
- Technical Committee for Sintered Parts
  - Sub-Committee for Sintered Bearings
- Technical Committee for Press Machines
- Technical Committee for Metal Powders
- Committee for Metal Injection Molding
- Marketing Committee
- Committee for International Standardizations
- Committee for Environment
- Committee for New Project (carbon-neutral)

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

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

Number of Committee Members: 15 persons

*Selection Committee for JPMA Award (Development Prize)

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

Committee for Administration

Chairman: Kosaku Fujita
(DIAMET CORPORATION)
New Chairman

Number of Committee Members: 20 persons

Sub-Committee for General Affairs

Number of Committee Members: 7 persons

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

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

Number of Committee Members: 8 persons
*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

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

Number of Committee Members: 13 persons

*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

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

Number of Committee Members: 13 persons

*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

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

Number of Committee Members: 13 persons

*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

*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

*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

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 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.
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.

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.
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.
  - Development of Soft Magnetic Powder Cores for Axial Gap Motors
  - SUMITOMO ELECTRIC INDUSTRIES, LTD.
  - High efficiency electric oil pump parts for HEVs clutch engagement (high pressure application)
  - SUMITOMO ELECTRIC INDUSTRIES, LTD.
  - Development of Sprocket Drive for One-Motor Hybrid
  - FINE SINTER Co., LTD.
  - Development of button parts for shale gas drilling tool
  - Porite Corporation
  - 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

![Image of a copper-based sintered alloy slider]

**FINE SINTER Co., LTD.**

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

![Image of sintered parts]

**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 CO$_2$ 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)
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.
<table>
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<tr>
<th>AREA</th>
<th>Iron-base (Metric Tons)</th>
<th>Copper-base (Metric Tons)</th>
<th>Total (Metric Tons)</th>
<th>21/20(%)</th>
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<td>Japan</td>
<td>89,239</td>
<td>2,776</td>
<td>92,015</td>
<td>113.5</td>
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<td>71,467</td>
<td>2,126</td>
<td>73,593</td>
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<td>China</td>
<td>162,612</td>
<td>10,780</td>
<td>173,392</td>
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<td>11,268</td>
<td>175,887</td>
<td>114.7</td>
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<td>Korea</td>
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<td>673</td>
<td>65,204</td>
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<td>58,681</td>
<td>1,118</td>
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<td>30,700</td>
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<td>10,200</td>
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<td>8,500</td>
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*Included “Others”