



POWDER METALLURGY ASSOCIATION OF INDIA

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Contents

- PM 24 Sponsors and Exhibitors
- Report - PMSC 2023
- Report - PPTDP-23
- Report - PMHT-23
- PMAI Initiative - GD and T outreach

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Editorial

Dear Friends, PMAI Well Wishers,

The Calendar Year 2023 has been a momentous one with serious milestones for PMAI. We inaugurated and moved to our own office premises and headquarters in January 2023.

We held 9 "Manthan" meetings (evenly spaced every 4 to 6 weeks), where a number of Industry and Academia stake holders, as well as active Governing Council Members from Pune - meet together to ideate the way forward were fruitful and resulted in further development of new initiatives.

We conducted a record number of activities and outreach for CY 2023, namely - International Conference PM23 (13 - 15 March 2023), a New Workshop on Industrial Plant Safety (12 July 2023), PM Short Course (3 - 6 October 2023), PM Products Tool Design Course (17 - 18 October 2023) and Heat Treatment of PM Parts (8 - 9 December 2023).

We are keeping up the momentum in Calendar Year 2024. We have planned a new focused Workshop in Partnership with ARCI on Advanced X Ray Techniques for Powder Metallurgy and Particulate Materials (17 - 19 January 2024).

We have conceptualised and are launching a brand new student outreach initiative Titled "Geometrical Dimension & Tolerances" (GD&T Workshop) which will be a free course. The workshop is jointly conceptualised by myself and our Valued Governing Council Colleague Mr. R. Sridhar, and the inaugural workshop will be held on 6 February 2024. With a focus on skilling young engineers (3rd / 4th semester), the workshop will impart relevant skills required to read Industrial Drawings, and take actions / communicate effectively in professional environment. Design Philosophies will also solidify faster for participating students, once these concepts are clear. We expect students and young engineers to greatly benefit from this outreach, and intend to engage with multiple institutions and expand this

outreach meaningfully. We hope that some of these students will take deep interest in Powder Metallurgy and align their Careers within our Fold. We already have confirmation of participation of students from COEP, as well as Sandip Institute of Engineering Nasik. An advanced GD&T Course will also be launched in the second half of 2024.

Last but not the least, Preparations for our International Conference PM24 (25 - 28 February 2024) are on in full swing. Our office is buzzing with volunteers, and we have planned an event befitting The Golden Jubilee of our Esteemed Institution.

I wish you all Good Health and Success for the coming days, and look forward to your continued support.

Best regards,

Aniket Gore



PM 24

50 GOLDEN JUBILEE CELEBRATIONS

years of PMAI

Platinum Title Sponsor



Diamond Sponsor



Gold Sponsor



Silver Sponsor



Details & online registration at www.pmai.in

NEWSLETTER

Powder Metallurgy Short Course-23 (PMSC23)

3rd -6th Oct. 2023

In Virtual Mode: Platform used: Microsoft Teams

A four-day short-term course on powder metallurgy “Powder Metallurgy Short Course-23 (PMSC23)” took place from 3rd -6th Oct. 2023 in digital mode. The program was organized by PMAI. Dr. Vaishali Poddar Convener – PMSC23 welcomed the participants and briefed participants about the structure of the workshop. Mr Aniket Gore, President, Powder Metallurgy Association of India gave an introduction about PMAI and its activities. Multiple invited talks were delivered by eminent speakers and covered various powder metallurgy and its application related topics as tabulated in Table 1.

Table 1: Topics of the invited talks covered by various invited speakers at PMSC23.

Sr. No.	Topic	Name of the Speaker
1	Overview of Powder Metallurgy and Particulate Materials Technology	Mr. N.L.Chandrachud, Consultant
2	High Density, High Performance PM Materials Processing	Mr. N. L. Chandrachud, Consultant
3	Maintaining Quality in PM Manufacturing	Mr. Rajendra Sethiya, GKN
4	Mechanical and Solution Methods of Powder Production for PM	Dr. K. Murli Gopal, Novoken Innovations
5	Commercial Iron powder technology: manufacturing, characterization & applications	Mr. M. Nipanikar, Hoganäs India
6	Powder Characterization	Dr. Vaishali Poddar, NIAMT, Ranchi
7	Design and fabrication of Tooling for PM	Mr. Sanjay Rastogi, Consultant
8	Consolidation of Powders: Binders, Lubricants & Sintering Aids	Dr. Raja Lenka, BARC, BARC
9	Fabrication / Shaping Methods for Advanced Ceramics and Composites	Dr. Deep Prakash, BARC
10	Thermal Methods of Powder Production for PM	Dr. Tarashankar Mahata, BARC
11	Thermal Consolidation of Powders Sintering Fundamentals	Dr. N.B. Dhokey, CoEP
12	Furnaces for sintering & heat treatment	Mr. Girish Chintawar, Fluidtherm
13	Sintering of Some Commercial Ceramics	Dr. S. P. Butee, CoEP
14	Surface Engineering of PM Components	Mr. Harshad Natu
15	PM parts Heat Treatment	Dr. N.B. Dhokey, CoEP
16	PM Porous Materials	Y.P.Fatangade, COEP
17	Bio-materials	Dr. MalobikaKaranjai, ARCI
18	Bond Matrices in Diamond cutting tools	Dr. Vivek Singhal, Sharp Diamond
19	Spray Forming and Powder Production	Dr. Vikas C. Srivastava, NML Jamshedpur
20	Additive Manufacturing and PM	Dr Deepak Pattanayak. CSIRCECRI
21	Friction Materials	Dr. MalobikaKaranjai, ARCI
22	Emerging Alloys in PM	Dr. Bharat Panigrahi, IIT Hyderabad
23	Metal Injection Molding	Dr. Vijay Thavale, COEP
24	Overview of PM Standards	Dr. Kaustubh Kambale, COEP

Each session comprised of dedicated discussions, challenges and opportunities in powder metallurgy technology development. There were 11 participants attending this course which were a mix of academia and industry. Industrial participation was represented by V Works Pune, Winsome Form Tech, Suraj Components pvt. Ltd., Baramati Metallurgical Pvt Ltd., Manohar Industries, and academic participants came from University Kebangsaan Malaysia, BHU, NIT Durgapur, COEP Technological University etc. After completion of all the sessions-certificates were given to the participants. During the valedictory function (online snap shown in Fig. 1), participants shared

feedback and suggestions - indicating the scope of improvement for PMSC24. Suggestions were duly onboarded and we are working on tweaking our program to improve it further.



Fig. 1 Snap of the valedictory function which took place on 6 Oct. 2023.

PM Products Tool Design Process-23 (PPTDP-23)

17 - 18 October 2023

Virtual Mode: Platform used: Microsoft Teams

A Two-day short-term workshop on powder metallurgy “PM Products Tool Design Process (PM-TD 23)” took place from 17th - 18th Oct. 2023 in virtual mode.

The program was organized by PMAI. Mr. Sanjay Rastogi Course coordinator – PM-TD 23 welcomed the participants and briefed about the workshop. Mr Aniket Gore, President, Powder Metallurgy Association of India gave introduction about PMAI and its activities. Mr. Sanjay Rastogi gave instructions for online mode of communication during PM-TD 23.

The 2 day session covered various aspects of powder metallurgical technology from tool design process. The Topics covered during the two-day online workshop are tabulated in Table 1.

Table 1: Topics covered during the two-day online workshop.

Day 1 (17th October 23)	Day 2 (18th October 23)
Basics of Powder Metallurgy Powder, Compaction & Sintering	Elasticity of Tools & Product Quality
Compaction - Fundamentals	Tea Break
Compaction - Fundamentals Contd	Tool Design Process - Product to Tool
Compaction - Interrelation between Product & Tool Design	Tool Design Exercise
Tool Friction & M/Q Ratio	Tool Design Process -General Assembly
Exercises	Exercises
Final Question & Answers / Concluding Remarks	Final Question & Answers / Concluding Remarks

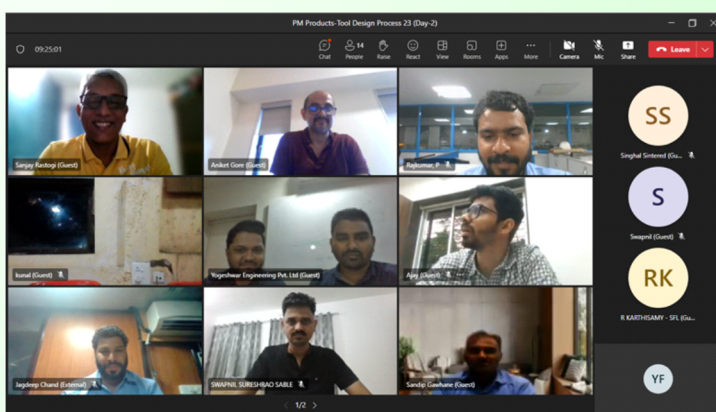


Fig. 1 Snap of the valedictory function which took place on 18 Oct. 2023.

Each session comprised of dedicated discussions, challenges and Exercises in powder metallurgy tool design process technology development. Overall, there were 18 participants attending this course which were drawn from diverse industries viz. Yogeshwar Engg Pvt Ltd, Kumar Process Consultants and Chemicals Pvt. Ltd, Samvardhana Motherson Innovative Solutions Ltd, Singhal sintered pvt ltd, Tenneco Automotive India pvt limited, Pondicherry, Bajaj Auto, Cosmo Ferrites, Sundram Fasteners Ltd, SAP Parts Pvt Ltd, Sintercom India Ltd, Delta Manufacturing Group, Goa Sintered, CIE Automotive India and academia from National Institute of Delhi etc. After completion of all the sessions, certificates were given to the participants.

During the valedictory function (online snap shown in Fig. 1), each participant was encouraged to share his / her experience in PM-TD 23 and course feedback was collected from all the participants.

Heat Treatment of PM Parts 23 (PMHT-23)

8 - 9 December 2023

In Hybrid Mode (Physical and Online)

A Two-day short-term workshop on powder metallurgy “Heat Treatment of PM parts (PM-HT23)” took place from 8th -9th Dec. 2023 in hybrid mode(Physical + Online).

The program was organized by PMAI. Mr. N. L. Chandrachud Course Coordinator – PM-HT 23 welcomed the participants at PMAI office and briefed about the workshop. Mr Aniket Gore, President, Powder Metallurgy Association of India gave introduction about PMAI and the activities housed under the flagship. Day 1 of the course was conducted by Mr. N. L. Chandrachud. Day 2 of the workshop was conducted by Prof Dhokey and Prof Menavlikar.

The Topics covered during the two-day hybrid mode workshop are tabulated in Table 1.

DAY 1 (8 th Dec, 2023)	DAY 2 (9 th Dec, 2023)
SPEAKER: N. L. CHANDRACHUD Introduction to Powder Metallurgy (Brief description of PM Process to understand the presence of pores and it's relation to the post sinter treatments like electro plating, heat treatment, welding etc.)	SPEAKER: N. B. DHOKEY Heat treatment of tool steels; Hardening and salt bath treatment; multiple tempering; microstructure and hardness, applications to dies and tooling.
SPEAKER: N. L. CHANDRACHUD Why heat treatment? Improvement in static and dynamic strength, relevance to microstructure Property measurement of PM pars – Understanding microstructures.	SPEAKER: S. MENAVLIKAR Furnace in relation to the thermal processing of metals, Batch type furnaces and continuous furnaces, Type of commonly used furnaces today for heat treatment and the details.
SPEAKER: N. L. CHANDRACHUD Theory of Quenching –Quenchants for PM Parts -Oils and polymers –Quench speed measurements; Types of heat treatments and their objectives mainly related to PM parts– Quench and temper.	SPEAKER: S. MENAVLIKAR Furnace protective atmospheres, Generation of atmosphere in furnace, Furnace instrumental and manual controls, Cryogenic treatments (Tool steels and high alloy PM parts).
(Q and A Session)	(QA and Closing Session)

Each session comprised of dedicated discussions, challenges and processes in powder metallurgy heat treatment process technology development. Overall, there were 8 participants attending this course from diverse industries viz. Sundram Fasteners Limited, Singhal Sintered Pvt. Ltd, Bajaj Auto., BorgWarner Morse Systems India Pvt. Ltd., and academia from PSG College of Technology.

After completion of all the sessions e-certificates were given to the participants. During the valedictory function (Hybrid snap shown in Fig. 1), each participant was encouraged to share his / her experience in PM-HT 23 and to communicate the scope of improvement in PM-HT 24 to further increase the usefulness of the course. The course feedback was collected from all the participants.



Fig. 1 Snap of the valedictory function which took place on 9 Dec. 2023

Powder Metallurgy Association of India (PMAI)

www.pmai.in

**One Day Online PMAI Certification Course
for 4th Semester Metallurgy Students & Fresh Engineers from Industry**

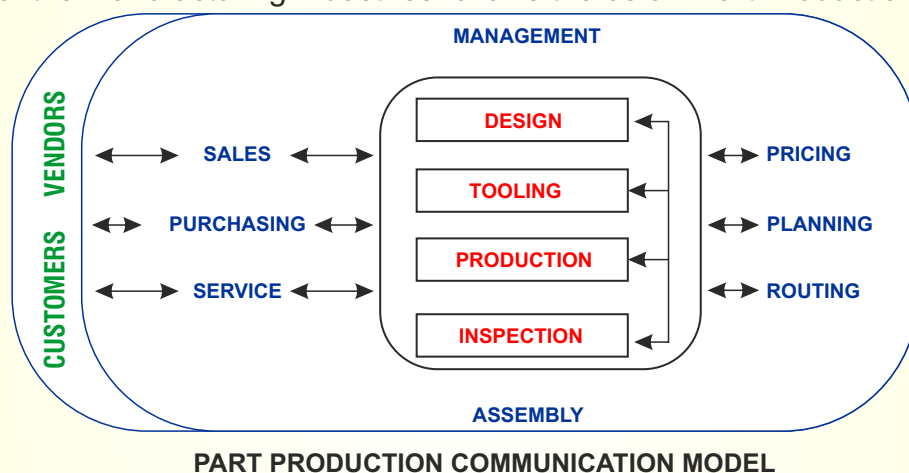
6th February 2024

NEW INITIATIVE

Geometrical Dimensioning and Tolerancing (GD & T)

“How Important GD & T for a Design, Manufacturing & Quality Engineer”

Most of the manufacturing Industries follows the below Part Production Model



Any Internal or External Communication between Engineers happens via an Engineering drawing which in-turn gets converted as a Product.

To aid the above, GD & T is an international tool or a language being followed to have an effective global communication to create a Product / Process Design, Cost Effective Manufacturing with Output of the required quality.

As a Fresh Engineer when you start work with any Manufacturing Industry, it is highly important to know the basics of GD & T to read and communicate well to implement Design philosophies to shop floor on a day to day basis.



Course Conductor: Mr. R. Sridhar

After serving 33 years in various functions like Engineering, Manufacturing and Quality of auto ancillary Industries, Mr. Sridhar a renowned Powder Metallurgy Expert, will impart training on the Basics of GD & T helping young Indian Engineers to interpret, read, & write Engineering Drawings.

Post this course, Engineering Students will be equipped to communicate effectively with global Engineering Teams. Recruitment Teams will give due weightage to students who have taken such a Unique Basic Course.

The course is conducted **"Free of Cost"** for bonafide students
Fresh Engineers from Industry - Registration Fee Rs. 500/-

Total Seats: 100

Registration: **First come, first served.**

Registration request to be sent to director@pmai.in