



# Powder Metallurgy Industry has a Bright Future - Narasimhan Gopinath

**T**he Powder Metallurgy Association of India (PMAI) is the premier organization for Powder Metallurgy (PM) professionals in India and was founded in 1973. The organization has been promoting PM related activities over the past three decades.

PM is a highly developed method of manufacturing reliable ferrous and nonferrous parts. Made by mixing elemental or alloy powders and compacting the mixture in a die, the resultant shapes are then sintered or heated in a controlled-atmosphere furnace to bond the particles metallurgically. Basically a "chipless" metalworking process, PM typically uses more than 97% of the starting raw material in the finished part. Because of this, P/M is an energy and materials conserving process.

The P/M process is cost effective in producing simple or complex parts at, or very close to, final dimensions in production rates which can range from a few hundred to several thousand parts per hour. As a result, only minor, if any, machining is required. PM

parts also may be sized for closer dimensional control and or coined for both higher density and strength. Most PM parts weigh less than 5 pounds (2.27 kg), although parts weighing as much as 35 pounds (15.89 kg) can be fabricated in conventional PM equipment.

Some of the advantages of the PM process are that it eliminates or minimizes machining, maintains close dimensional tolerances, permits a wide variety of alloy systems, provides materials which may be heat-treated for increased strength or increased wear resistance, offers long-term performance reliability in critical applications and is cost effective.

President of **PMAI Narasimhan Gopinath** says that the the annual sale

in India of iron PM components as parts is approximately Rs 1600 crore per year and approximately Rs 120 crores per year Cu based alloy parts. He spoke on length of the challenges facing the PM industry and the way forward to thrive to **Sanjay Singh, Features Editor of Metalworld**. Excerpts

*“Communication, automobile and defence technology is rapidly evolving. PM will always be relevant and PM part makers will thrive.”*



*“PM is an exciting as well as an energy efficient and eco-friendly technology in which 98 percent and more of the raw material is found in the finished product. Part producers and users of metal and ceramic components should not lose sight of this.”*

**What would be total size of the market for powder metallurgy products?**

- The annual sale in India of iron PM components as parts is approximately Rs 1600 crore per year and approximately Rs 120 crores per year Cu based alloy parts. The quantum of PM parts within assemblies is difficult to quantify and can be estimated as being about another 50 crore. The sale of PM hard metal will be approximately Rs 800 crores per year and all other ceramic, composite and heavy metal parts will account for approximately Rs 250 crores.

**What are the technical challenges facing the PM community?**

- PM is an exciting as well as an energy efficient and eco-friendly technology in which 98 percent and more of the raw material is found in the finished product. Part producers and users of metal and ceramic components should not lose sight of this.

PM are not fully dense and this suffer in certain types of physical properties. However, the special features of this technology enables a whole slew of enhanced properties when parts are designed keeping the process in mind.

The challenge for the PM part and powder producer are therefore, getting this fact through to the consciousness of the part designer, users and purchasers.

All too often a part that is traditionally forged or cast is tossed to the PM part maker for replication. If the functionality of the part and the possibilities that PM offers are taken into

account, the number of parts that will come into the fold of PM will increase by leaps and bounds. Even if a fraction of the true potential of PM is exploited the production of PM parts will quadruple worldwide.

**What has been the recent technological innovations carried out in this field?**

- For a start the entire technology of powder injection moulding and more recently, additive manufacturing.

In the area of conventional press and sinter the developments are focussed on making high performance parts of a higher density with processes like powder forging, warm compaction, HIP, Surface densification and modern heat treatment processes including sinter hardening and sinter brazing.

**As an Association President what message would you like to give to your members?**

- Communication, automobile and defence technology is rapidly evolving. PM will always be relevant and PM part makers will thrive.

The question, however, is whether it will be the same part makers of today or another breed entirely. Will today’s part producers make the journey or will they be left by the wayside.

PM will not fail but companies can and the way to stay ahead is to continuously invest in R&D, either individually or as a consortium for which PMAI is an ideal platform.

Consortium R&D requires individual firms to invest just a fraction of the total and the

shared use of facilities for development makes for new products and business avenues that is otherwise out of the reach of the individual. All association get a sense of purpose when demands are made of it by its members and PMAI is no exception.

**Is the government doing enough to promote Powder Metallurgy in the country and what are the difficulties you face?**

- The PM division of DMRL and IARC, both in Hyderabad are the only government promoted initiatives in the promotion of PM as far as I can see. Their efforts, however, are directed to defence needs and there is no trickle down to Indian industry other than a couple of outdated examples which are continuously showcased.

The PMAI initiative towards the establishment of a Diploma training and facility for consortium research by industry is hampered by the lack of any scheme for creating and nurturing such an effort. It somehow seems unfair that the tax collected from industry goes to the easy spend of immense amounts of money on public institutions which do not benefit industry who is the main earning member of the family, in any significant manner.

**What is the current strength of your association?**

- The current strength of the associations is 528 life members and 13 corporate members.