Annual Report 2015

A comprehensive report on EPMA’s activities throughout 2015
Introduction by the President

Dear Members, PM Colleagues and Partners,

Every year at this time I am glad to take a look back at what our Association has accomplished in the last 365 days.

I believe it is important to share the current status and the trends of our European PM industry, a sector that has been dynamic and successful these last years.

First trend to report is that we have seen in Europe a very strong PM parts production. 2015 was once again a very dynamic year for our PM industry. PM production hit a double digit growth versus the previous year. This reflects the global vitality of our industry that has been sustained in its growth. Moreover, average weight of PM parts in cars continues to increase constantly, and PM is now reaching the aircraft industry. Another example is AM: it is spectacular how fast the Additive Manufacturing sector grew in the last decade.

Furthermore, successful development in PM results from the optimization of the activity of the players at all levels: Structural Parts, MIM, Hard Materials, Hot Isostatic Pressing, Additive Manufacturing sectors. All sectoral PM groups are entangled: from the powders to the parts, including of course all designers and manufacturers of specific equipment and machinery.

Our supply chain continues to be supported by a powerful Research & Development European Network, with at least 20 significant famous PM academic research centers, in close connection with the industry.

As you know, EPMA is a nonprofit Association, serving the PM industry since 1989. It counts approximately 190 corporate members from 29 countries worldwide: it is the highest ever level of corporate membership!

And I believe that our Association continues to serve its members through 3 key missions:

Firstly, the Association represents and develops PM technology at a European level being an essential link between our companies and what is happening in Brussels especially on legislative matters in our field of activity.

Another mission of the Association is to promote the European PM Industry, within Europe as well as internationally. PM technology is promoted using all main communication media such as seminars, technical conferences, web tools, video shootings, the shared global property database as well as “how-to” guides for end users. Not to forget events dedicated to young engineers and newcomers in PM business to attract new potentials and future customers.

Finally, EPMA develops the future of PM by creating space that could have various forms where debates, reflections, technical discussions, shared R&D programs, emulative and construction exchanges can take place such as at our PM congress.

2015 was also marked by a difficult event for our Association with the sudden loss of our friend and colleague Jonathan Wroe. I would like to take the opportunity to pay tribute to his wonderful job as Executive Director of EPMA and remember an exceptional man who was passionate about Powder Metallurgy, dedicated to our industry, and believed in the potential of EPMA. Jonathan plainly contributed to the success of the Euro PM congress, which took place in Reims last October.

2016 will be marked by a unique event for our European PM industry: the World PM in Hamburg! I know that many of our members are highly committed to turn it into a unique and great time, showing the strength of the scientific, technological, industrial and economical potential of PM, as well as the unique skill breeding ground that Europe has created in PM!

To conclude, I would like us to share my strongest belief that globally PM has a great development potential progress in motion in the coming years because it is: fast-moving, lean, green, cost efficient, and innovative.

Yours faithfully

Philippe Gundermann
EPMA President
2015 has seen the EPMA developing its service to members in terms of networking, education and training, lobbying, fostering synergies and promotion of PM.

Regarding networking, nine open and special meetings were organised for the five sectoral groups of the EPMA: ESPG (Press and Sinter), EuroMIM (Metal Injection Moulding), EHMG (Hard Materials), EPHG (Hot Isostatic Pressing) and EAMG (Additive Manufacturing). The sectoral groups are a very important link towards our members and the meetings foster discussions and synergies in each sector according to their specific needs and development areas. EPMA expresses its gratitude to all those members who have participated in the meetings and especially to the steering groups of all five sectoral groups for their great support in the preparation and chairing of the meetings.

The Euro PM2015 Congress & Exhibition was successfully held in Reims with over 750 attendees from 41 countries and a large exhibition area with 92 booths. More than 100 scientific and technological lectures were presented for the benefit of participants. We also had our second Young Engineers’ Day, comprising 30 undergraduates, from 3 universities around Reims, who discovered Powder Metallurgy. EPMA would like to thank, in particular, our French members for their assistance and also the members of the Technical Programme Committee who provided much useful support.

EPMA continues to maintain its efforts in training and education activities which included the PM Summer School, which was held for the first time in the UK, in Sheffield, and the Powder Injection Moulding Short Course that took place in Barcelona. The EHMG also organised its well-known WINTEREV workshop in Didcot, near Oxford, UK. During EPMA’s training events the participants enjoyed high quality of lectures, workshop and all the events proved to be successful.

In terms of our European level activities EPMA continues to use its membership in Eurometaux and other EU institutions to provide support and information for members on REACH and other EU environmental legal specific legislations, such as Energy and Carbon Taxes.

The success of EPMA’s club projects continues with the EHMG, ESPG and EPHG groups undertaking work on industry specified short term research. By the end of 2015 fifteen projects have generated more than half a million euros since the start of club projects in 2009 through R&D efforts in PM. Regarding EU supported projects, EPMA is still acting as a dissemination and training partner in the EFFIPRO project until September 2016.

In 2016 EPMA will again have a strong programme of training activities, with an Additive Manufacturing Seminar being held in Bremen, Germany, and the PM Summer School, which will take place in Valencia, Spain. In addition, EPMA is organising the second EHMG SUMMEREV workshop to take place at Hilti, Lichtenstein.

The main event of 2016 will of course be the World PM2016 Congress & Exhibition, which will take place in Europe again after six years, in Hamburg, Germany from 9-13 October, with a full topic programme including 70 technical sessions and five special interest seminars. Interest is high for the event with the exhibition area nearly full and the programme of over 500 oral and poster papers, and it will also be complemented by meetings organised by our Sectoral Groups, and another Young Engineers’ Day.

Jonathan Wroe Tribute

Mr Jonathan Wroe, EPMA Executive Director, passed away on Friday 4 December after a short illness.

Jonathan was a great Executive Director, who during 14 years turned the EPMA into a successful Association for the benefit of all the Powder Metallurgy community. This was an enormous and painful loss for all of us as friends and colleagues and for the European PM industry as a whole. The PM Industry lost a great man, who was dedicated to the industry and made the EPMA what it is today and a forward looking trade association.
Members of EPMA met together in Barcelona for their Annual Meeting. Executive Board and Council meetings were held on 11 June, followed by the informal Annual Dinner at the stylish Tragaluz Restaurant.

The EPMA General Assembly took place on the following day at PIMEC, an association for small and medium companies. EPMA President, Mr Philippe Gundermann, welcomed members to the meeting and gave an overview of the current financial and market situation in Europe. PM, he said, would continue to develop due to it being a lean, green, cost efficient and innovative technology.

Mr Jonathan Wroe, Executive Director of EPMA, then gave an update of EPMA’s activities over the past twelve months, marking the Association’s 25th anniversary including PM training courses, the new Young Engineers’ day and Euro PM2014 Congress in Salzburg, which was the best attended Euro PM to date. He went on to report that the Association has recovered its membership numbers to pre-crisis levels and produced a break-even financial result in 2014.

Mr Guy Thiran, Director General of Eurometaux gave a keynote speech focusing on ‘Impact of Current and Future EU Legislation on the Powder Metallurgy Industry’. He highlighted how widespread and important the flow of legislation from the EU has become and how the links between Eurometaux and EPMA can assist in protecting the interests of its members.

The annual meeting concluded with meetings of the European Structural Parts Group (ESPG). Next year’s Annual Meeting will take place 7-8 April in Brussels.
Council

The EPMA Constitution requires the Council to be composed of a minimum of seven individuals with voting power and appointed by the General Assembly. In practice, the Council has always been larger than its permitted minimum. Seats on Council are allocated according to the number of Full Members in each of the sectors making up the EPMA’s spectrum of interest; at the same time, consideration is given to ensuring an equitable geographical spread of Council members across Europe.

Current Council Members for the 2013-2016 Period:

**Representing PM Parts Sector**
Dr Alessandro De Nicolo (GKN Sinter Metals, Italy)
Mr Peter Kjeldsteen (Sintex A/S, Denmark)
Dr Michael Krehl (PMG, Germany)
Dr César Molins (AMES SA, Spain)
Dr Harald Neubert (Miba Sinter GmbH, Austria)

**Representing Powder Sector**
Mrs Vania Grandi (Rio Tinto, Germany) (replaced Mr Greg Lavallee in June 2015)
Dr Pierre Blanchard (Erasteel, France)
Mr Per Engdahl (Höganäs AB, Sweden)
Mr Jim Shaul (Hoeganaes Corporation, Germany)

**Representing Equipment Sector**
Mr Ingo Cremer (Cremer Thermoprozessanlagen GmbH, Germany)
Mr Thomas Lambrecht (Dorst Technologies, Germany)

**Representing Refractory and Hard Material Sectors**
Dr Lorenz Sigl (Plansee SE, Austria)
Dr Henk van den Berg (Kennametal Shared Services GmbH, Germany)

**Representing PM Semi Sector**
Mr Philippe Gundermann (Aubert et Duval Holding, France)

**Representing MIM Sector**
Mr Martin Blömacher (BASF AG, Germany)
Dr Bruno Vicenzi (MIMItalia, Italy)

**Representing Hot Isostatic Pressing Sector**
Ms Jody Turin (Bodycote AB, Sweden)

Contact details for current Council Members can be found on the EPMA website.

**Executive Board (2013-2016)**
Seven Council members have been elected to the EPMA Executive Board for the current period:

**President**
Mr Philippe Gundermann

**Vice Presidents**
Mr Ingo Cremer
Dr Michael Krehl
Dr Harald Neubert
Mr Thomas Lambrecht
Dr César Molins

**Treasurer**
Mr Peter Kjeldsteen
Day-to-day management is in the hands of the Executive Director and his staff.

Jonathan Wroe †
Executive Director

Olivier Coube
Technical Director

Joan Hallward
PM Training Courses Coordinator

Andrew Almond
Marketing & Exhibition Manager, Promotion

Kate Blackbourne
Congress Manager

Karen Powell
Membership / Project Administrator

Tammy Harris
Website Administrator

Jacqueline Peters
Accounts, PM Publications

Scarlett Williams
Events Assistant

Tom Reece
Graphic Communications Assistant
Outlook for 2016

2016 brings a tide of change for EPMA, with a new Deputy Executive Director, Dr Lionel Aboussouan, having been appointed in February 2016. To assist with Lionel’s settlement and adjustment to the job, he will be mentored by ex EPMA Council member Dr Volker Arnhold who has taken on the interim role of EPMA Executive Director.

Alongside a change in management, 2016 also sees a change to the composition of the EPMA Council with the elections taking place for the 2016-2019 term at the 29th General Assembly in Brussels on 8 April 2016. Details of the Council members and their roles and responsibilities will be announced on the EPMA website in mid-April 2016.

The biggest event on the horizon is the World PM2016 Congress and Exhibition.

Exhibition space is already over 90% booked and a full topic programme of high quality oral and poster papers are under preparation in the seven strands for this year’s event. We will be organising the third instance of our Young Engineers’ Day, which is designed to introduce undergraduate students to the world of PM as a potential career opportunity. More details will be released via the World PM2016 event website.

We will as usual be organising and assisting a range of other events including the PM Summer School, the AM Seminar and the Summerv workshop.

2016 will be an exceptionally busy year as EPMA continues to revise and develop relevant services for members wherever we can.
EPMA Membership 2015

Membership has remained stable in 2015 with 313 in total, 187 corporate and 126 individual/student members i.e. close to a 60/40% split, based in over 30 countries worldwide.

Membership Subscription Rates
It was agreed at the November 2015 Council meeting that 2016 membership rates should be frozen at 2008 levels for the eighth successive year. The Full Member (micro/start-up company) 60% discount rate has remained popular; 6 new members joined this category in 2015.
EPMA Membership 2015

New members in 2015
EPMA was pleased to welcome the following into membership during the year.

Full Members

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Associate Members

| ASCO Sintering Co. | KTH Royal Institute of Technology | Metal Powder Products Company | Quanzhou Tianzhi Advanced Alloy Materials & Technology Co., Ltd |

Affiliate Members

| Seco Tools AB |

Individual Members

| Pierre-Yves Chaucesse | Vincent Foong | Victor Polard | Yoshinobu Takeda | Evelyne Vallat |
EU: Regulations and Legislation

The EPMA has, through a process of ongoing lobbying and positive contributions to debate, been able to position itself to participate in and influence, the EU’s formulation of regulations and legislation.

REACH and other EHS Legislation Activities

In December 2015 the EPMA issued its 105th REACH News Flash. This regular email news flash informs over 320 interested EPMA member contacts about the latest developments of REACH and related legislation.

The EPMA continues to follow the EHS legislation, especially REACH and CLP, to assess their potential impact on the PM industry. In parallel, EPMA continues to follow the development of Exposure Scenarios, which establish the threshold levels of metals in our industry. Nickel thresholds for inhalation are especially followed by EPMA who are in close contact with the Nickel REACH Consortia. EPMA also works with and supports other metal institutes in their efforts to defend their sectors since the EPMA is a multi-metallic association. Thus, among others, the EPMA is following the Lead Specific Concentration Limits issue, which may have consequences on the PM industry and supports Eurometaux, who defend the metal industry in this special case.

Sectoral Groups

European Hard Materials Group (EHMG)

Chairmen: Dr Leo Prakash (WTP Materials Engineering), Dr Steve Moseley (Hilti AG)

The EHMG activities of 2015 were mainly the organisation and coordination of several Club Projects. The EHMG also organised the “WINTEREV” Hard Materials Workshop on “Superhard Materials & Superabrasives Properties and Characterisation” in Didcot, UK (43 participants) on the 8-10 April 2015.

For the Euro PM2015 Congress and Exhibition the EHMG prepared a General Open Meeting on the Tuesday 6 October and a Special Interest Seminar on “State-of-the-art on Fast Sintering Processes for Hard Materials” on the Wednesday 7 October.

European MIM Group (EuroMIM)

Chairmen: Prof. Dr. Frank Petzoldt (Fraunhofer IFAM), Bruno Vicenzi (MIMitalia)

The EuroMIM group covers over 75 organisations from across Europe and from all parts of the MIM supply chain. The current co-chairmen are Bruno Vicenzi from MIMitalia and Frank Petzoldt from Fraunhofer IFAM Bremen, supported by Lars Nyborg, Chalmers University of Technology; Keith Murray, Sandvik Osprey Ltd and Martin Blömacher, BASF SE.

Current activities can be divided into three parts:

Promotion of European MIM

As part of the EuroMIM’s promotional activities in 2015, the EuroMIM group ran a Powder Injection Moulding 2-day short course in Barcelona in April 2015.
Technology and Quality Development

During the past eight years, EuroMIM has undertaken an annual benchmarking exercise for MIM parts makers across Europe.

Roadmap

The EuroMIM meeting in Reims attracted approximately 50 attendees and included a panel discussion on the question whether Additive Manufacturing would emerge as supporting or competing technology to MIM.

European Structural Parts Group (ESPG)

Chairmen: Mr Peter Kjeldsteen (Sintex), Dr Cesar Molins (AMES)

The ESPG held an ESPG General and Parts Makers meeting on the 12 June 2015 in Barcelona and an ESPG General and Parts Makers session in October 2015 during the Euro PM2015. The ESPG held a Special Interest Seminar during the Euro PM2015 on “Key issues in Sintering” co-chaired by Prof José Torralba (UC3M, Madrid) and Prof. Herbert Danninger (TU, Vienna).

PMRADNET

This group comprises the 15 leading PM related universities and research groups across Europe. Partners continue to work on a bilateral basis on student exchanges, joint projects and use of equipment. They also provide a number of the lecturers for the PM Summer Schools and the Sintering Short Course.

After discussion at the last meeting the PM RADNET group has advised that Alberto Molinari will act as the representative on the EPMA Council for the next three years.

European PM HIP Group (EPHG)

Chairmen: Dr. Susan Davies (Bodycote), Dr. Johan Hjärne (Quintus)

The group now covers over 100 organizations from across the whole supply chain, including powder producers, equipment suppliers, part producers, end users and academics. Activities of the group aim to promote PM HIP technology by organizing a series of one day End user workshops in different European countries each focusing on particular topics, for example wear and corrosion protection, applications in oil and gas, … One EPMA club project had been set up by the group in order to technically benchmark PM-HIP materials against conventionally produced materials. An important issue that prevents comprehensive market penetration of PM HIP near net shape parts is a lack of standardization in comparison to competing conventionally produced materials. Thus, EPHG lays a focus on standardization activities, knowing well, that sustainable success in this field needs long lasting and patient efforts.

European Additive Manufacturing Group (EAMG)

Chairmen: Ralf Carlström (Höganäs) and Claus Aumund-Kopp (Fraunhofer IFAM)

The EAMG published a 46 page brochure on Metal-Based Additive Manufacturing in September 2015. The Euro PM2015 Congress and Exhibition was also an important event for the EAMG with five technical sessions on AM, a second open EAMG meeting and a Special Interest Seminar on Status and Trends in Additive Manufacturing.
Working Groups

Environmental Health and Quality (EHQ)

Benchmarking is a requirement under both ISO9000:2000 and ISO TC16949, and since 2001 EPMA has offered companies the chance to benchmark their operations externally. The procedure comprises 24 questions covering all the productivity benchmarks for the PM industry such as Delivery Achievement, Productivity, Energy usage, Overall Equipment Effectiveness, Wage, Absenteeism etc… The 2015 exercise saw a total of twelve sites participating in the programme.

We also maintain the service advertising EPMA member quality accreditation on the EPMA website, which remains a popular area amongst the 50,000 visitors per year to the site. EPMA also provides, through the members’ area of the website, information on REACH (Documents to Download, Letters to suppliers, Letters to Customers, Workshop contents, useful links etc).

Following the request of the council, the EPMA has approached two organisations in order to benefit from their activities and their influence at the European Commission regarding the EU Energy and Climate Change legislation. The EPMA is now member of the Eurometaux Energy and Climate Change Policy Department and an associate member of the Industrial Federation of Industrial Energy Consumers IFIEC Europe. IFIEC Europe represents the interests of industrial energy users in Europe for whom energy is a significant component of production costs and a key factor of competitiveness in their activities in both Europe and throughout the world.

Research Education Training (RET)

Chairmen: Dr Pierre Blanchard (Erasteel)

On behalf of the RET the EuroMIM ran a fourth Short Course on “Metal Injection Moulding ” in Barcelona on 15-17 April 2015, which attracted 33 participants and 16 lecturers.

The RET has also been mandated to coordinate a new Roadmap “Vision 2025: Future Developments for the European PM Industry” with the support of the sectoral groups. For this purpose a Roadmap Steering Committee was formed to support the RET in this task. The final Vision 2025 Roadmap was published early 2015 and is now available on the EPMA website.

European PM Industry Roadmap - Vision 2025

In 2015 the EPMA launched the revised PM Roadmap called ‘Vision 2025’. Thanks to the help of our steering committee and with a lot of input from members, the brochure was circulated to all EPMA Members, stakeholders and industry publications.

Designed mainly to be a tool to aid in the promotion of the PM industry to government and third parties we also hope that it gives some useful insight into key trends and development areas for the different sectors of our industry.

Available as a download from the EPMA website we have also circulated copies to our contacts in government and funding agencies, both directly and via social media platforms. We encourage you to use the document and the information within it, both internally, and as a support in developing future R&D proposals.

We believe that the new Roadmap will contribute positively to the promotion and development of the industry in the coming years.

www.epma.com/vision2025
The EPMA Council agreed in 2009 that the EPMA would organise a Summer School, whose costs would be underwritten by the Association’s reserves. Since then we have held six successful events in Kosice, Madrid, Dresden, San Sebastian, Trento and Kraków.

The very positive results from these Summer Schools meant that we held a seventh in 2015 at the University of Sheffield, the first time that a Summer School was held in the United Kingdom. Thanks to the input from our 20 guest lecturers and the support of Professor Iain Todd from the University of Sheffield, Professor José Torralba from IMDEA Materials Institute and Mr Denzil Lawrence from the Advanced Manufacturing Research Centre (AMRC), the event was again a great success. Participants: 32 from industry, 15 from academia and 6 from research institutions, came from 13 countries throughout Europe and worldwide. They had an opportunity to visit the University of Sheffield laboratories and participants also had the chance to visit both the Additive Manufacturing plant Metalysis Ltd as well as a tour around the AMRC facilities.

The Summer School Gala Dinner was held at Silversmith’s Restaurant, the home of modern Yorkshire cuisine. The evening was rounded off with the now indispensable Summer School Singing Contest which continued into the small hours.

Thanks to the on-going, high level of demand from members, academia and end users we are holding another Summer School this year. It will take place in Valencia, Spain, 27 June – 1 July 2016, hosted by Professor Vicente Amigó Borrás of the Universidad Politécnica de Valencia. After seven years at the helm, Professor José Torralba of IMDEA Materials Institute, is stepping down as our Summer School Coordinator. His place will now be taken by Dr Marco Actis Grande of the Politecnico di Torino and Dr Christian Gierl-Mayer of TU Vienna, who will jointly coordinate the Summer School.

www.epma.com/summerschool
Following on from the successful Sintering Short Courses in 2012, 2013, and the Hardmetal Short Course in 2014, the EPMA held a Short Course on Powder Injection Moulding (PIM) in Barcelona, 15-17 April, encompassing the entire PIM supply chain. Thirty-four engineers and scientists from throughout Europe joined with fifteen speakers drawn from both industry and academia to give an overview of trends in the field of PIM. Lectures included: Powder Manufacture, CIM, Injection Moulding/Micro Moulding, Raw Materials: Feedstock, Debinding, Sintering Options, Mould Design and Case Studies amongst others. Participants also had the opportunity to visit the PIM Laboratory of Dr Gemma Herranz at the University of Castilla-La Mancha.

www.epma.com
Research and Development Projects

As far as research and development work is concerned, the projects can be divided into two. Firstly large scale, mainly publicly financed projects and then those projects where funding has been co-ordinated on a private basis by the Secretariat using members’ direct funding. This method has produced a number of smaller scale, but equally successful projects e.g. Ultrasonic Fatigue Testing of Hard Materials and Toughness of PM HIP Steel stage. During the last six years some 15 projects valued at over €520,000 have been successfully completed some of them now entering a second or even third phase.

Members Club Projects

Global PM Property Database

The online database GPMD was launched in 2004 as a joint project between the leading regional PM trade associations, the EPMA and its sister organisations in North America (MPIF) and Japan (JPMA). Over the period content has been increased to a total of nearly 4000 lines of high quality data covering both ferrous and non-ferrous PM materials as well as MIM. The number of registered users continues to grow steadily and has now exceeded 10,000.

A major step forward in expanding the reach of the GPMD has been the agreement originally signed in 2009 with Granta Design based in Cambridge, England a leading company in materials information technology. As a result the GPMD data is now available to a range of end users as part of an integrated and comprehensive materials information management system called HBM Ncode.

The need for members to be proactive in helping in providing information is essential for the growth and success of this long standing and valuable project. New data was uploaded during the year and further improvements made to the operation of the website.

www.pmdatabase.com
Members Club Projects

The EPMA continues to coordinate several club projects in order to improve the synergy of the PM community. EPMA club projects are open to corporate EPMA members. All projects and project proposals are presented in detail on the EPMA web page: www.epma.com/projects

Two club projects are now completed (“Ultrasonic fatigue testing of hardmetals in the gigacycle regime: Stage 2a” and “Kinetic Simulations in Hardmetals – Evaluation of Mobilities by Coupling Experiments and Simulations”) with their final meetings in October. During these meetings achievements were reviewed together with the industrial partners and the R&D contractors and possible follow up projects were also discussed.

A third project on Harmonisation of Safety Data Sheets (SDS) for Fe Base Metal Powders and Metal Powder Mixes for Uses in PM Processes “SDS” in partnership with Powder Metallurgy Solutions (Dr. Volker Arnhold), Germany and supported by 8 Industrial Partners (Hoeganaes Corporation Europe S.A., Höganäs AB Sweden, Höganäs Belgium, POMETON, GKN Sinter Metals, Miba Sinter Group, PMG, AMES) was also launched and concluded in 2015.

In the meantime, three other club projects started:

A project on Correlation study of mechanical properties/microstructure/fracture behavior of industrial parts and standardized tensile specimens “MicroTest” in partnership with the Instituto IMDEA Materiales, Madrid and supported by 5 Industrial Partners (AMES, GKN Sinter Metals, Höganäs AB, Miba, PMG)

A project on Micro-mechanical testing: a quantitative method for measuring local mechanical properties in hardmetals in partnership with CEIT San Sebastian, NPL London and UPC Barcelona and supported by 6 Industrial Partners (Ceratizit, Hilti, Sandvik Coromant, Sandvik Hyperion, Kennametal Shared Services, Seco Tools, Element 6).

A project on Resistivity of Hardmetals – Part Two (RoH2) in partnership with the NPL, London and CEIT, San Sebastian and supported by 3 Industrial Partners (Ceratizit, Kennametal, Hilti).

Furthermore, two club project proposals were presented to the PM community at the last ESPG and EAMG meetings during the Euro PM2015:

Project 1 - Quality Test for Selective Laser Melting (SLM) powder (SLM-POWD) in partnership with Fraunhofer IFAM, Bremen.

The project proposal addressed the following three objectives:

1. Study the applicability of three metal powders (to be defined) for the Additive Manufacturing process of Selective Laser Melting
2. Set up a guideline on how to characterize and specify AM powder for SLM
3. Set up a guideline on how to find the right laser parameters to process powder with SLM

Project 2 - Design for Sintering – Dealing with the anisotropy of dimensional changes: “DfS” - Demonstrator Project in partnership with the Department of Industrial Engineering, University of Trento.

The project aims are to investigate the influence of the geometry of the parts, the material and the green density on anisotropy of dimensional change on sintering of uniaxially cold compacted greens. The expected benefits for the industrial partners are the development of a design procedure and a knowledge database in order to evaluate the influence of density and sintering temperature in standard and non-standard process conditions.

Toughness of PM HIP Steel Stage 2

www.epma.com/projects
EFFIPRO

EFFIPRO (Energy Efficient Manufacturing Process) is a three-year Project which was launched in September 2013, it is part funded by the European Commission in the 7th Framework Programme. The objectives of this Project are to develop a significantly shorter PM process using a new concept of hybrid electrical current assisted sintering and hard materials with improved properties, thus resulting in a more energy efficient and cost effective process. The developments of this Project will directly impact on the cutting tools industry as tools with enhanced properties and a longer lifetime will be obtained using a highly efficient process. Two types of parts will be machined, one for the aerospace sector and the other for the automotive sector. For this Project, the EPMA has joined a Consortium of eight members including: The University of Seville (USE), Fraunhofer IFAM, AMES Group, MIRTEC S A., KYOCERA UMMERCO, Airbus Group and TECNALIA as the Project Leader. The EPMA’s main responsibility is for the dissemination and training activities. More information can be found at the project website

www.EFFIPRO.org
The city of Reims noted for its Cathedral of Notre-Dame de Reims and being the centre of the Champagne region hosted this year’s annual Euro PM Congress & Exhibition. A truly international event with delegates attending from over 40 countries in all regions including the Far East, Africa and the Americas. The appeal of the Euro PM2015 event meant that it attracted over 200 oral and poster presentations and a strong attendance of some 800 participants.

The event also included a sell-out exhibition with some 90 booths covering companies from all parts of the PM supply chain. Jonathan Wroe, EPMA Executive Director said “Reims has proved a delightful location for Euro PM2015 with its compact facilities. We would like to thank the City of Reims, our members and delegates for their support, which is much appreciated”.

During the Congress plenary session, EPMA Distinguished Service Awards were presented to Dr Brian James (ex Hoeganaes Corp) and Prof Lorenz Sigl (Plansee SE) and six special keynote paper awards to those papers selected as having the highest merit were presented to:

- Dr Raquel de Oro Calderon from the Technical University of Vienna,
- Dr Anssi Laukkanen of VTT Manufacturing and Materials Finland,
- Dipl Ing Thays Machry from Airbus Industries, UK
- Ing Andreas Meyer from Friedrich-Alexander-University Erlangen-Nurnberg
- Dr Alfred Sidambe of JRI Orthopaedics in UK
- Miss Anna Weddeling of Ruhr-Universitat Bochum

The traditional Congress Dinner was held in the Palais du Tau and provided a suitable finale to a dynamic and productive Euro PM event.

**Young Engineers Event at Euro PM2015**

Following the success of the first Young Engineers’ Event in 2014, it was repeated during the Euro PM2015 in Reims. Three universities took part (KU Leuven, RWTH Aachen University & Université de Franche-Comté).

The students undertook a two-day programme of lectures on the PM process, question and answer sessions with industry experts and recent graduates now working in PM. They also had tours of the exhibition and a research centre (CRITT-MDTS, Charleville-Mezieres, France) to give them an appreciation of the variety of PM employment areas.
Euro PM2015 in Pictures

Plenary Session

Poster Area

Exhibition Area

Congress Dinner

Congress Dinner

Young Engineers
2015 Exhibition Schedule

**Medtec UK 2015**

The EPMA attended Medtec UK 2015 event, a conference aimed at the UK medical applications market. Medtec UK is the national version of the much larger Medtec Europe show. The 2015 event took place for the first time at London’s ExCel Event Centre, 3-4 March and comprised two conference tracks on various medical subjects and healthcare technologies.

Medtec UK was a compact event, which made for some interesting discussions and interactions between the companies exhibiting regarding how Metal Injection Moulding can best be employed for future medical applications.

**Develop 3D Live!**

In March the EPMA attended the Develop3D Live Conference and Exhibition at Warwick Arts Centre, located at the University of Warwick. Following on from the success of previous year’s Develop3D Live events, this year’s programme consisted of insights relating to 3D Printing/Additive Manufacturing, which included sessions and presentations on how additive manufacturing (AM) is being used in the jewellery industry and how AM is being used to create a bespoke product in the cycling sector.

“This year’s event showed how diverse AM manufacturing process is becoming and why there is so many potential uses for this type of technology” said Andrew Almond, EPMA’s Marketing Manager. He went on to add “One of the lectures described AM as a ‘disruptive technology’, whereby it creates a new value chain in the manufacturing process, disrupting existing value chains, which is making a new type of consumer category, referred to as the ‘prosumer’.” It was interesting to see how AM is changing the way industry views its manufacturing processes and how this process can link directly with the end user, allowing for an increase in tailor-made products.

The 2015 event attracted over 1,000 attendees with some 50 exhibiting companies all packed into the Warwick Arts Centre.

**World PM2016 Congress & Exhibition Stand**

In June 2015 the World PM2016 Congress & Exhibition exhibited at the PowderMet 2015 event, which included the launch of the World PM2016 Exhibition Floor Plan and Exhibition Package to the North American market.

‘This was a great way to show potential exhibitors the benefit of exhibiting at the European stage of a World PM Exhibition series’, explained Andrew Almond, EPMA’s Exhibition Manager. He added ‘Having a presence at the PowderMet show provided numerous networking opportunities to discuss the newly launched World PM2016 Exhibition Floor Plan.’

During the two-day event over 20 exhibition booths were reserved for the forthcoming World PM Exhibition.

**EPMA attends GALM Lightweight Vehicle Manufacturing: Joining, Forming & Assembly Summit**


Hosted at the Birmingham Botanical Gardens as part of the Global GALM series of Automotive Lightweight Material Conferences, the 2 day event focused specifically on reducing the costs and complexity of high volume manufacturing processes with special emphasis on multi material joining, forming and assembly advancements for the next generation lightweight vehicles. The comprehensive schedule was an arrangement of technical sessions and keynote speakers. Over 160 delegates from automotive companies throughout the UK attended the event to ascertain the recent advances in lightweight manufacturing from end users, such as PSA Peugeot Citroen and Ford.

The conference was a strong networking tool, with the EPMA promoting the lightweight aspects of powder metallurgy over competing industrial processes, helping to educate attendees on how the various PM sectors can add value to the lightweight vehicle manufacturing sector.
EPMA Exhibit at Advanced Engineering UK 2015 Exhibition, 4-5 November 2015, NEC, Birmingham, UK

Following on from the successful PM and Additive Manufacturing presentations at last year’s Advanced Engineering UK Exhibition the European Powder Metallurgy Associations (EPMA) decided to exhibit at the event, to promote the advantages of powder metallurgy and its associated sectors.

Stand, K105, located in the Performance Metals area, provided a great location to disseminate the recently launched EPMA Introduction to Additive Manufacturing Technology brochure, as well as the Introduction to Metal Injection Moulding and Hot Isostatic Pressing brochures.

To further stimulate interest in these PM sectors there were presentations from EPMA Members on Additive Manufacturing and Hot Isostatic Pressing topics. Tuesday 4th November saw Tony Alderton, Plant Manager, TTI Letchworth, providing a presentation on the ‘Benefits of Hot Isostatic Pressing for Cast and Advanced Manufactured Products’. On the second day of the event Keith Murray, Sales & Marketing Manager, Sandvik Osprey Ltd - Powders Group delivered a well-received presentation on the ‘Developments in Metal Powders for Additive Manufacturing’.

EPMA Exhibit at New formnext 2015 Event

The European Powder Metallurgy Association (EPMA) exhibited at the newly created formnext 2015 powered by tct exhibition. Formnext 2015 powered by tct was devised as an international tool and form-making industry showcase for the huge potential of using Additive Manufacturing (AM).

Formnext covered 14,000 m² of exhibition space and delivered 233 exhibitors (48% come from outside Germany) who showcased their most innovative products and new developments, mainly in the area of AM. Industrialisation and how to move AM into mass production was a dominating topic. While there were a couple of mould makers and machine tool builders, standard parts suppliers and other process suppliers to the tool and mould industry were underrepresented. Current trends in tool and form-making were presented, which included faster and more flexible production of mould inserts, use of new materials, and the use of different additive manufacturing methods.

‘Exhibiting at one of the up-and-coming AM exhibitions in Europe allowed us to proactively promote the recently launched Introduction to Additive Manufacturing Technology brochure, to a European mainstream AM sector, whilst at the same time raising the awareness of the EPMA’s European Additive Manufacturing Group (EAMG) and all the benefits it has to offer this sector, explained Andrew Almond, EPMA’s Marketing Manager.'
## Financial Statements

EPMA is governed by Belgian Law of 25 October 1919, as amended by that of 6 December 1954. The Association, "un Association internationale poursuivant un but scientifique", is therefore exempt from Belgian income tax. The Secretariat, situated in the UK, is registered for UK VAT. EPMA works to a calendar year. The Articles of Association require that members contribute towards the expenses of the EPMA through an annual subscription; the generation of funds from other sources and activities compatible with its objectives is permitted. Belgian law requires that the EPMA Council shall submit the accounts for the past year and the budget for the following year for the approval of the General Assembly. Set out below are the accounts for 2014, with those of 2013 for comparison.

**ACKNOWLEDGEMENTS:** Accounts prepared and audited by Turner Peachey Chartered Accountants, Shrewsbury, UK.

### Income

<table>
<thead>
<tr>
<th></th>
<th>2015 (€)</th>
<th>2014 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership fees</td>
<td>389,182</td>
<td>373,935</td>
</tr>
<tr>
<td>Publications and promotions</td>
<td>3,602</td>
<td>4,955</td>
</tr>
<tr>
<td>Conferences, seminars and courses</td>
<td>644,986</td>
<td>735,694</td>
</tr>
<tr>
<td>EU and other projects</td>
<td>134,797</td>
<td>287,368</td>
</tr>
<tr>
<td>Summer School</td>
<td>31,522</td>
<td>30,075</td>
</tr>
<tr>
<td>Bank Interest Received (gross)</td>
<td>4,889</td>
<td>5,473</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td><strong>1,208,978</strong></td>
<td><strong>1,437,500</strong></td>
</tr>
</tbody>
</table>

### Expenditure

<table>
<thead>
<tr>
<th></th>
<th>2015 (€)</th>
<th>2014 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries social charges and pensions</td>
<td>414,143</td>
<td>375,821</td>
</tr>
<tr>
<td>Office overheads</td>
<td>58,599</td>
<td>45,888</td>
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<tr>
<td>Subsistence and travel</td>
<td>27,002</td>
<td>11,014</td>
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<tr>
<td>Publications</td>
<td>9,496</td>
<td>12,899</td>
</tr>
<tr>
<td>Conferences, seminars and courses</td>
<td>463,699</td>
<td>602,828</td>
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<tr>
<td>Professional and membership fees</td>
<td>66,114</td>
<td>33,945</td>
</tr>
<tr>
<td>Council and meetings expenses</td>
<td>12,707</td>
<td>43,868</td>
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<tr>
<td>Promotions</td>
<td>12,971</td>
<td>27,449</td>
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<tr>
<td>Bank and credit card charges</td>
<td>6,728</td>
<td>4,872</td>
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<tr>
<td>Taxation on interest received</td>
<td>1,077</td>
<td>903</td>
</tr>
<tr>
<td>Exchange rate differences (note 4)</td>
<td>(43,906)</td>
<td>(21,387)</td>
</tr>
<tr>
<td>Printing, stationery, postage and sundries</td>
<td>15,684</td>
<td>7,810</td>
</tr>
<tr>
<td>EU and other projects</td>
<td>103,500</td>
<td>210,970</td>
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<tr>
<td>Summer School</td>
<td>38,643</td>
<td>30,688</td>
</tr>
<tr>
<td>Depreciation</td>
<td>10,303</td>
<td>7,298</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td><strong>1,197,075</strong></td>
<td><strong>1,394,866</strong></td>
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</tbody>
</table>

**Surplus of income over expenditure**

11,903

42,634

Expenditure relating to 2016/2017/2018

83,813

Expenses relating to 2015/2016/2017

46,090

**Net Surplus of income over expenditure**

(71,910)

(3,456)
## BALANCE SHEETS AS AT 31 DECEMBER 2014

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>€</td>
<td>€</td>
</tr>
<tr>
<td><strong>FIXED ASSETS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment 1</td>
<td>31,154</td>
<td>21,211</td>
</tr>
<tr>
<td><strong>CURRENT ASSETS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debtors 2</td>
<td>309,937</td>
<td>479,038</td>
</tr>
<tr>
<td>Bank accounts</td>
<td>1,043,248</td>
<td>1,047,515</td>
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<tr>
<td><strong>CURRENT LIABILITIES</strong></td>
<td>1,439,223</td>
<td>1,526,553</td>
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<tr>
<td>Creditors 3</td>
<td>613,921</td>
<td>619,398</td>
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<tr>
<td></td>
<td>825,302</td>
<td>907,155</td>
</tr>
<tr>
<td></td>
<td>856,456</td>
<td>928,366</td>
</tr>
<tr>
<td><strong>REPRESENTED BY:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated fund at 1st January</td>
<td>928,366</td>
<td>931,822</td>
</tr>
</tbody>
</table>

Less: Surplus of expenditure over income

Add: Surplus of income over expenditure

| | 856,456 | 928,366 |

---

Financial Statements
## NOTES TO THE FINANCIAL STATEMENTS - YEAR ENDED 31 DECEMBER 2015

### 1. FIXED ASSETS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment brought forward</td>
<td>21,440</td>
<td>20,999</td>
</tr>
<tr>
<td>Additions during the year</td>
<td>20,962</td>
<td>7,671</td>
</tr>
<tr>
<td>Disposals during the year</td>
<td>(945)</td>
<td>(395)</td>
</tr>
<tr>
<td></td>
<td>41,457</td>
<td>28,275</td>
</tr>
<tr>
<td>Less: depreciation @ 25%</td>
<td>10,303</td>
<td>6,998</td>
</tr>
<tr>
<td></td>
<td><strong>31,154</strong></td>
<td><strong>21,211</strong></td>
</tr>
</tbody>
</table>

### 2. DEBTORS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales ledger balances</td>
<td>309,937</td>
<td>479,038</td>
</tr>
<tr>
<td>Other debtors</td>
<td>86,038</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>395,975</strong></td>
<td><strong>479,038</strong></td>
</tr>
</tbody>
</table>

### 3. CREDITORS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PM conference amounts due</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Purchase ledger balances</td>
<td>97,271</td>
<td>2,229</td>
</tr>
<tr>
<td>Membership fees received in advance</td>
<td>371,737</td>
<td>382,342</td>
</tr>
<tr>
<td>PAYE owed to inland revenue</td>
<td>13,606</td>
<td>13,553</td>
</tr>
<tr>
<td>Taxation</td>
<td>3,673</td>
<td>3,964</td>
</tr>
<tr>
<td>Professional fees</td>
<td>12,218</td>
<td>6,081</td>
</tr>
<tr>
<td>Other sundry creditors</td>
<td>5,058</td>
<td>15,058</td>
</tr>
<tr>
<td>EU and other projects</td>
<td>108,512</td>
<td>196,060</td>
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<tr>
<td>VAT</td>
<td>1,846</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td><strong>613,921</strong></td>
<td><strong>619,398</strong></td>
</tr>
</tbody>
</table>

### 4. EXCHANGE RATES

The figures in the Income and Expenditure accounts have been converted at the actual rate of exchange for each month. The Balance Sheet figures have been converted at the closing rate of exchange as at 31st December 2015, which was £1 to €1.358610 (2014 £1 to €1.287045) and differences arising are shown in the Income and Expenditure account as 'exchange rate differences'.