

MIM meeting

Chairmen:

Prof Dr.-Ing. Frank Petzoldt (Fraunhofer IFAM, Germany)
Dr Bruno Vicenzi (Clayver srl, Italy)

Sunday 9th October 16:30 – 18:30



Agenda

Welcome and Introduction by Chairmen (Prof Dr.-Ing. Frank Petzoldt / Dr Bruno Vicenzi)	16.30-16.35
Trends Survey feedback (Dr Bruno Vicenzi, Clayver srl)	16.35-16.45
Market Overview (Keith Murray, Sandvik Osprey Ltd.)	16.45-17.00
Panel Discussion : End Users Case Study : What is the potential of MIM for end users business ?	16.55-17.45
Club Project proposal	17.55-18.05
MIM Seminar 2017	18.05-18.15
Conclusion by Chairmen	18.25-18.30

Trend Survey Feedback short outlook

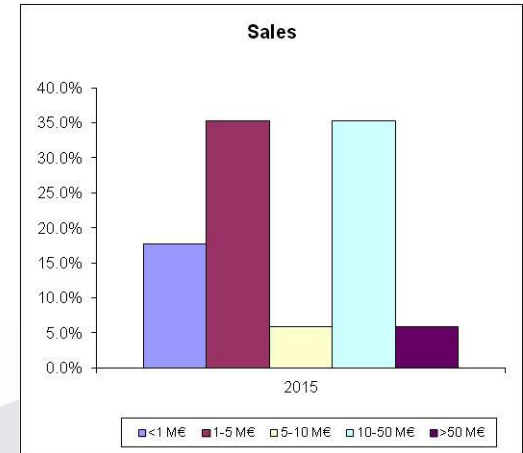
EuroMIM Trends Survey 2016

Included

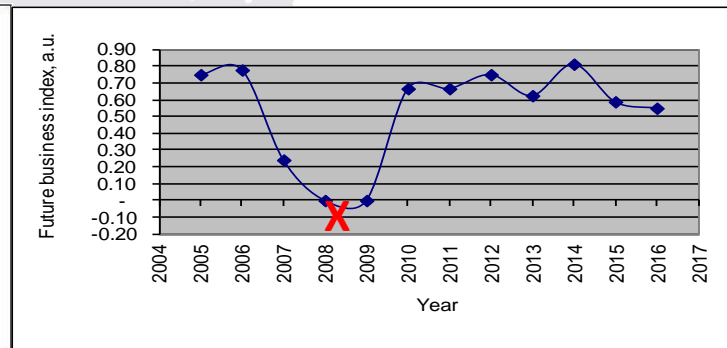
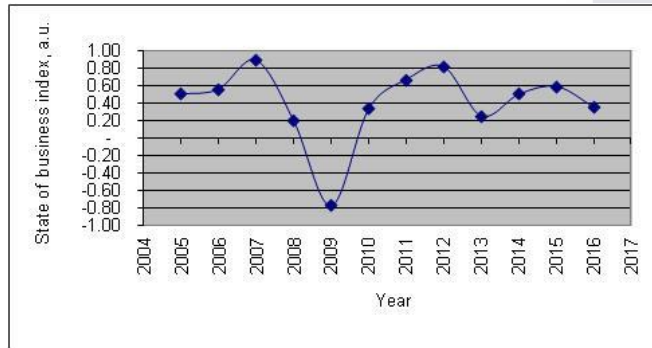
- 12 manufacturers
- 10 powder/feedstock/equipment
- 2 others (University/consultants)

General assessment of the business: good but not as good as in the best years

Expectations for next year: positive



Aggregate indexes



www.worldpm2016.com

Trend Survey Feedback short outlook

MIM sales trend for 2015

- 65% up (2015: 50%)
- 20% stable (2015: 40%)

MIM sales trend 2016

- 79% (56% in 2015) vote increase
- Only 5% decrease (slight)

About 60% will be adding capacity (Highest value since 2011)

www.worldpm2016.com

Main problems that slow down the widest acceptance of MIM?

- Awareness of MIM
- Price competition (other tech, low-cost countries)

Sectors offering the best medium term prospects for MIM?

- Medical and automotive always preferred
- Automotive and consumer up



Market Overview

- Keith Murray



Panel Discussion – End Users Case Study

What is the potential of MIM for end users business?

- Moderator
 - Prof Dr.-Ing. Frank Petzoldt (Fraunhofer IFAM)
- Speakers
 - Dipl.-Ing. Katharina Horke (Rolls-Royce) for aerospace application
 - Dipl.-Ing. Karl-Heinz Otto (Tricumed) for medical technology.
 - Marco Mulser (Fraunhofer IFAM)
- Panel



Break

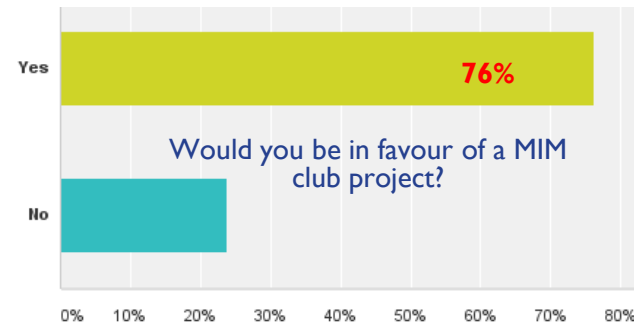
10 mn



Club Project Proposal

Proposals were from Roadmap 2025

- Zero defect program
- Updating and developing new MIM standards
- Developing new materials and powder grades
- Advanced process to include more functionality into components
- Tailored properties of MIM components
- Simulation of the process chain



Answer Choices	Responses
Improving raw material quality and specification methods	17.65% 3
Developing new materials and powder grades	41.18% 7
Simulation of the process chain	23.53% 4
Widen the size range of commercially viable components (micro and macro)	5.88% 1
Improvements in energy efficiency along the process, with a focus on sintering	5.88% 1
Advanced processes to include more functionality into components	29.41% 5
Tailored properties of MIM components	29.41% 5
'Zero defect' programme	52.94% 9
Ensuring the biocompatibility of materials as the medical market is of significant importance for the MIM industry	17.65% 3
Process improvement and further understanding of the debinding furnace	17.65% 3
Updating and developing new MIM standards	41.18% 7
Total Respondents: 17	

- Proposal from the group
- Who is interested?
 - ?
 - ?
 - ?
 - ?

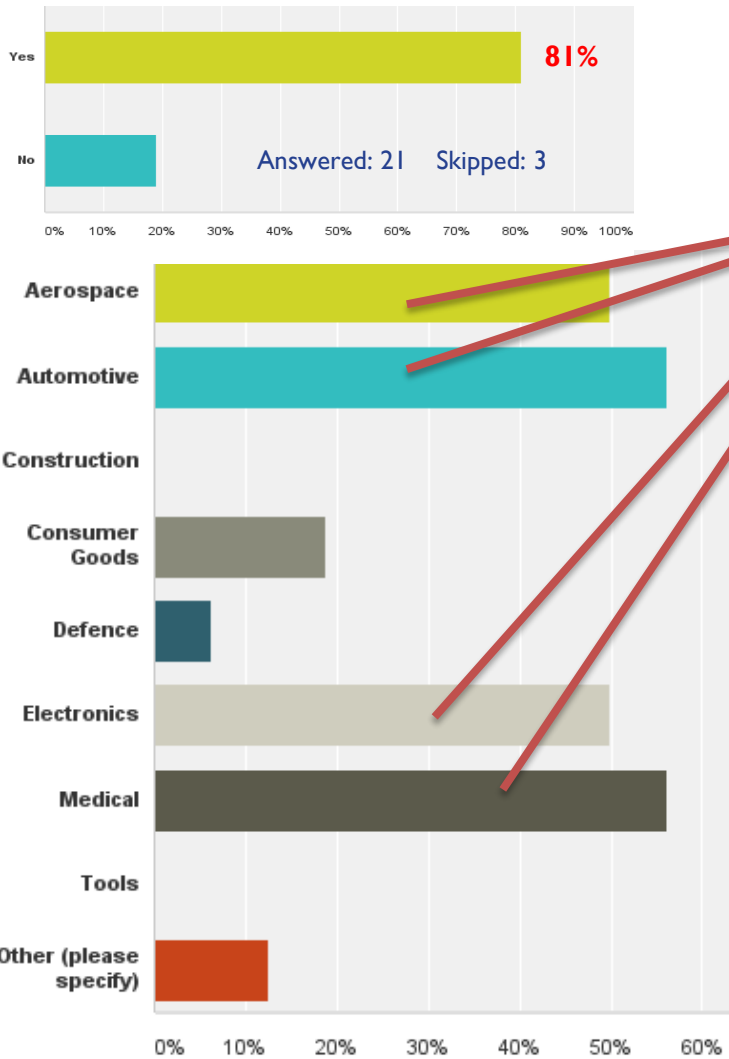
Club Project Proposal from Fraunhofer IFAM Dresden

- Impact of gas flow on delubrication and reduction during heat treatment of PM components
- The consumption of process gas during the heat treatment of PM components causes significant costs, in particular when reducing atmospheres are used. However, only little is known on the impact of gas flow rates on the delubrication mechanisms and the loadability of the atmospheres with decomposition products. The same holds for the impact on the reduction of surface oxides, which is essential for a proper sintering result. Thus, the parameterizing of such processes typically is done empirically and, to be on the safe side, gas flow rates are adjusted too high.
- The aim of the present project is the identification and quantification of the impact of the gas flow rate on the process parameters needed to produce high quality PM components. In this context, the main questions to be answered are:
 - What is the maximum loadability of typical process atmospheres with decomposition products of the delubrication/debindering?
 - How do low gas flow rates affect the required parameterization of the heat treatment?
 - How does the gas flow rate and the loading of the process atmosphere with decomposition products affect the decomposition dynamic (e.g. needed delubrication times)?
 - How does the gas flow rate of reducing atmospheres affect the reduction of surface oxides?
- Therefore, typical PM steel with typical lubrication agents (for example Astaloy CrM + Kenolube) will be heat treated with various gas flow rates. In the first step, the process determining gases will be determined by measuring the gas composition at constant heating rates. In doing so, the maximum decomposition rates and optimum reduction temperatures will be figured out. In the second step, the concentration decrease of the process-determining gases at fixed temperatures and various gas flow rates will be evaluated.
- At Fraunhofer IFAM Dresden Technologies have been developed which allow to determine the actual chemical composition of the process gas within the furnace. The method gives precise information on thermochemical processes and their temperature dependency. Thus, debindering mechanisms as well as reduction or decarburizing reactions can be evaluated under realistic conditions, enabling effective design or optimization of heat treatment processes. The method also has been used to measure the chemical composition of process gases within the delubrication zone of belt sintering furnace.
- P. Quadbeck et al., Atmosphere monitoring in a continuous sintering belt furnace, J. Mater. Process. Technol. 231 (2016), 406-411

- Who is interested?
 - ?
 - ?
 - ?
 - ?

MIM Seminar 2017: Are you in favour of a MIM seminar in 2017?

- Oriented from MIM community to end users / “collaborative” meeting



1 seminar with 4 topics

- Automotive
- Medical
- Aerospace
- Electronics
- When: April
- Committee
 - MIM Steering committee + end users willing to join

Conclusion by Chairmen

- Click to add text

