

EuroHM Sectoral Group Open Meeting

Wednesday 15th October 2019, 11:00-12:30

at the Euro PM2019 Congress & Exhibition

Maastricht Exhibition and Congress Centre (MECC), The Netherlands, Room 0.9

Chairpersons: Dr. Steven Moseley (HILTI) and Prof. Luis Llanes (UPC)

Minutes

1 Contents

1	Contents.....	1
2	Participants	1
3	Agenda	1
4	Welcome and Introduction by the Chairmen (Prof. Luis Llanes, Dr. Steven Moseley)....	2
5	Proposed Collaborative Projects in HM (Dr. Olivier Coube, OCSynergies)	2
6	Update on the EPMA Club Projects and Other Activities (Kenan Boz, EPMA)	3
7	Keynote Presentation 1 : 30 Years of Hard Materials in Europe: A review (Dr Björn Hoschke, Kennametal)	3
8	Keynote Presentation 2 : The future of European Hard Materials (Prof. Susanne Norgren, Sandvik)	4
9	Discussion, Any Other Business, Conclusions, Next meeting	5

2 Participants

104 participants attended the meeting.

3 Agenda

1. Welcome and Introductions by the Chairmen (Prof. Luis Llanes, Dr. Steven Moseley) and a Few Words and Pictures in Memory of Leo (Dr. Steven Moseley)	11:00-11:10
2. Proposed Collaborative Projects in HM <i>In Memory of Dr. Leo Prakash, the projects' originator</i> (Dr. Olivier Coube, OCSynergies)	11:10-11:20

3. Update on the EPMA Club Projects and Other Activities (Mr. Kenan Boz, EPMA)	11:20-11:30
4. Keynote Presentation 1 on <i>30 Years of Hard Materials in Europe: A review</i> (Dr Björn Hoschke, Kennametal)	11:30-12:00
5. Keynote Presentation 2 on <i>The future of European Hard Materials</i> (Prof. Susanne Norgren, Sandvik)	12:00-12:30
6. AOB, Closing remarks, Announcements and Next Meeting	12:30-12:35

4 Welcome and Introduction by the Chairmen (Prof. Luis Llanes, Dr. Steven Moseley)

The meeting starts by welcoming of Steven Moseley and Luis Llanes as the chairmen. Steven gives a short history of the EuroHM sectoral group and a memorial look-back together with Leo Prakash's memorial pictures with the way he used to work fully motivated and dedicated to HM community within the last 25 years, especially his famous words of "I understand nothing" where he was able to understand more than anyone else actually.

5 Proposed Collaborative Projects in HM (Dr. Olivier Coube, OCSynergies)

OC starts his speech with a memorial history of Leo Prakash about how Club Projects started in EPMA, as the first one being in 2009 with the topic of Ultrasonic Fatigue Testing of Hard Metals. He stressed the critical role of Leo in the start of this new concept that shows the way for a successful series of Collaborative "Club" Projects with 15 HM projects between 2009 and 2019. He said that Leo was always behind the preparation of each project and Leo was always active and full of ideas of new projects. OC presented the two last ideas of Collaborative projects that Leo was supporting.

OC introduces two projects that will be carried out in Leo's Memory organised by OCSynergies:

- Corrosion Testing of Hard Metals (CorroHM): Defining guidelines to verify the corrosion behaviour of hardmetal grades in liquid environments in a reliable and reproducible way
- Benchmarking of 3 AM processes for hard metals (AddiHM): These processes are Fused Filament Fabrication (FFF), Metal Binder Jetting (MBJ) and Direct Ink Writing (DIW)OC welcomes any possible partners in his Collaborative Project Proposals.

6 Update on the EPMA Club Projects and Other Activities (Kenan Boz, EPMA)

KB gives a summary presentation about EPMA and its activities including the following topics:

- A review of the EPMA Sectoral and Working Groups and their typical activities
- All the seminars organised by EPMA in 2019 and 2020
- General information about the Club Projects and EU funded Projects.
- Announcement of EuroPM 2020 in Lisbon, Portugal between the dates: 4-7 October 2020.

KB continues his speech with the explanation of what a club project is. Then he gives statistical information about EPMA Club Projects as:

- Total Number of Projects Up to Now: 28
- Total Raised Funding: 1.018.306 €
- Current Number of Running Projects: 6
- Projects to be started before 2020: 3

KB introduces the change in EU funding strategy by European Commission to SME's stating that the analysis of Horizon 2020 program has shown the funding used by SME's are only 10% and there will be a change in EU Policy for funding projects to cover SME's with smaller budgets and less load of bureaucracy by the end of 2020. KB emphasizes that EPMA will be following this issue.

KB finalizes his speech by welcoming new project ideas and asking the attendees to contact him if they have any ideas of starting a collaborative club project.

7 Keynote Presentation 1 : 30 Years of Hard Materials in Europe: A review (Dr Björn Hoschke. Kennametal)

BH starts his presentation with a review of HM history starting by 1989, the fall of Berlin wall with the possibility of closer collaboration between the eastern Europe and the Western Europe community. Especially the German hard metal community benefiting from unification with the Combination of Eastern and Western Europe know how and use of synergy of European know how –Key competence of the EuroHM Sectorial group.

BH continues his speech with Hard metal substrate development – Cemented carbide with gradient structure (Binder enrichment surface). In the eighties and going nano by 2004. The next topic he covers is coating development with an overview of different coatings such as TiN, Al₂O₃, TiAlN, WC/C etc. that improves cutting performance. He then gives examples of processes using HM:

- Metal Injection Molding

- Cross-hole pressing
- Industry 4.0
- Additive Manufacturing
- Computer Simulation
- Thermal analysis on powdermetallurgical and ceramic materials (in IKTS)

BH gives examples of geometry development in HM such as insets with inner cooling channels, modular tool systems.

BH continues his speech with Superhard materials that are harder than carbon and low alloy steels. Hardness above ~850 HV / ~65 HRC / ~8 GPa. He then gives examples of Superhard materials such as Polycrystalline Cubic Boron Nitride (PCBN), Polycrystalline Diamond (PCD) and Diamond tools. BH mentions some U-turns in HM

- Inverse gradient (2005)
- Low pressure injection molding (1998)
- Microwave sintering (1998)

He finalizes his speech with applications from yesterday and today such as cutting submarine Kursk in 2001.

8 Keynote Presentation 2 : The future of European Hard Materials (Prof. Susanne Norgren, Sandvik)

SN welcomes everyone and promises for a short speech. She explains megatrends of the world with challenges and opportunities as: demography, climate change /scarcity, information and communication technology, globalization and urbanization. SN gives a prediction graph for the world population until 2100. She gives global steel production forecast as 2,8 billion tons by 2050 and mentions various industries for Tungsten end-use.

SN gives figures of forecast of Aerospace industry to be producing 43.000 aircrafts within 10-15 years, where the industry uses AM in a geometrically increasing trend. SN talks about Cobalt substitution due to increasing demand on Electrical Vehicles. SN gives the figure of Cobalt first-use as 101,5 Ktons in total, and mentions debates going on Cobalt to be a hazardous material or not. With a memorial to Leo Prakash, SN gives alternative binders to cobalt as 70Fe-18Ni-12Co and 25Fe-25Ni-50Co.

SN mentions various industries for end-use of Cobalt where transportation and Mining are the two sectors having a share of more than 50%. SN gives a list of major players in Mining Industry as :

- Caterpillar Inc.-US
- Komatsu Ltd.- Japan
- Liebherr Group-Europe
- Sandvik-Europe
- Hitachi Construction Machinery Co. Ltd.
- Atlas Copco/Epiroc-Europe
- Metso Corp.- Europe
- Outotec- Europe

SN gives two examples from Mining industry: Top Hammer and Rotary Drilling with differences in sintering routes and WC distributions, and an exception as Dual Property (DP)

carbides of Sandvik. SN mentions that European Players of the market are working on creating a difference by:

- New Gradient Carbides
- New Compositions
- Post treatments
- Precipitates in binder

SN gives further examples such as Tribochemistry that is defined as defined as the chemical reactions that occur between the lubricant/environment and the surfaces under boundary lubrication conditions (WC , Co and SiO₂ to produce Co and W sillicides)

SN continues her speech with examples of additive manufacturing from Sandvik Additive Manufacturing such as 3D printed nozzle in Hardmetal. SN mentions also fourth industrial revolution as beacons of technology and innovation in manufacturing.

SN finalizes her speech by explaining ICME (Integrated Computational Materials Engineering) that shortens time from idea to product and emphasizing the difference between Subtractive (Classical) and Additive (New Generation) shaping of materials.

9 Discussion, Any Other Business, Conclusions, Next meeting

With little time for discussion, the meeting was closed, and also the next meeting was not indicated. Anyway, due to the shorter programme during the General Assembly days in Brussels in 2020, a meeting there is not foreseen. The next meeting will be planned at the Euro PM2020 congress in Lisbon, Portugal, 4th -7th October 2020.