

Promoted by MAMM-ER working group and by ELCA Internationalization project

Industrial lightweighting technology developments: a European perspective and materials applications in Emilia-Romagna

5th of May, 2021 / 15.30-18.00

The event will open with a **scenario on lightweight processes at European level** and the presentation of a project for the internationalization of the "**lightweight made in Europe**" competences, in which also Clust-ER MECH is involved.

The meeting will then focus on the presentation of lightweighting solutions through the application of **innovative polymeric materials** and **new metal alloys** for additive manufacturing, with the contribution of international guests.

The initiative is organized by **Clust-ER MECH**, and promoted by **MAMM-ER** - the working group dedicated to advanced materials - and the **ELCA Internationalization project**.

Agenda

15:30 **Introduction**

Moderator, *Luca Tomesani - Clust-ER MECH's Board of Directors*
Value chain MAMM-ER: *Federica Bezzi - ENEA-TEMAF, Claudio Ricci - SACMI Imola*
Federico Capucci - Clust-ER MECH

- **The European Lightweight Cluster Alliance: a coordinated vision of lightweight materials and technologies, opportunities ahead for 2021-2030**

Ricardo Del Valle, Elca Network

- **Elca Cosme: how a European clusters collaboration is going to create a new international strategy in the lightweight materials and technologies field**

Pascaline Patureau, Polymeris

- **High performance polymers for lightweighting and performances improvement**

Andrea Aicardi, GHEPI

The use of high-performance polymers, thanks to a specific engineering, allows to obtain significant improvements in terms of lightweighting, integration of functions with reduction of parts number and production processes, compared to metals.

Case history: package gripping system for food packaging machine.

- **Lightweighting across industries. Expanded polymers case**

Arnaud Coulon, JSP

Lightweighting is a necessary challenge. Less materials produced and used, in more sustainable ways, to preserve resources as well as energy while fulfilling the demand from our society and industry. Expanded materials are able to solve the equation thanks to high strength to weight ratio, adaptable properties and enhanced recyclability, compared to composite solutions.

From automotive seats to HVAC via thermal containers, ARPRO constantly addresses these issues.

- **Improving bonding and fracture toughness of metal-composite bonded joints by AM: an overview**

Luca Raimondi, University of Bologna

Structural adhesive joints involving Selective Laser Melting (SLM) metal to a composite material have significant potential for weight and costs saving in aerospace, automotive, and several other industries. Several techniques were developed over the years, each one with specific material limitations: the aim of this work is to illustrate the current knowledge on various aspects of this technique. Existing gaps in the literature are identified and perspectives for future research are assessed.

- **High strength high temperature light alloys produced via LPBF: Ti6242 and a newly developed Al-Alloy**

Martina Riccio, Beamit Group

Despite AM processes are already widely used in several industrial applications, there are only few materials that are specifically designed and optimized for these technologies. Beamit has recently developed and characterized two new light alloys for high temperature applications: the Ti6242 and a new patented Al-Alloy. Their use

in high temperature demanding applications can allow the component lightweighting.

- **Light weight gas atomised metal powders for Additive Manufacturing**

Eleonora Bettini, Paul A. Davies, Sandvik

The range of gas atomized metal powders adapted and designed for Additive Manufacturing technologies, including Laser – Powder Bed Fusion (L-PBF) and Binder Jet Printing has never been wider. Classic examples of light-weight wrought materials include Ti6Al4V, which is a popular alloy used in both aerospace and medical AM applications and recently applied to machining tool holder systems to both reduce vibration and increase productivity. The traditional automotive casting alloy AlSi10Mg is also a popular material for L-PBF due to the ability to rejuvenate and recycle processed powders, while maintaining powder performance and material properties over multiple builds. As production volumes by AM increases, the powder utilization is of increasing importance, especially for high value added products like Ti6Al4V. Finally, a review of new alloy powder developments for both Titanium & Aluminium based materials and other lightweight materials is provided.

- **Modelling microstructure evolution in the production of 6XXX aluminium alloys components**

Marco Negrozio, University of Bologna

The control of microstructure of Al-Mg-Si alloys is gaining an increasing industrial interest because of the influence of grain size on mechanical, aesthetic, corrosion and crush properties. To predict the grains evolution during severe plastic deformation processes involved in the manufacturing of complex industrial components, a numerical model has been implemented and optimized by matching extensive experimental analyses with the outcomes of FEM simulations. Aim of this project is to develop a reliable model to optimize deformation processes at a design stage, saving time consuming and expensive trials.

- **Q&A Session**

18:00 Closing

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