Participants

MARCAM ENGINEERING
www.marcam.de

TNO
www.tno.nl

Hydrauvision
HYDRAULICS & PNEUMATICS
www.hydrauvision.com

DANISH TECHNOLOGICAL INSTITUTE
www.dti.dk

sirris
driving industry by technology
www.sirris.be

FJ · SINTERMETAL
www.fji.dk

Fraunhofer IFAM
www.ifam.fraunhofer.de

mbproto
PROTOTYPE & AIDE À LA CONCEPTION
www.mbproto.com

FLYING CAM
www.flying-cam.com

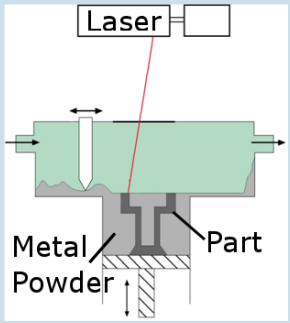
SITEX 45 S.R.L.
BUCURESTI - ROMANIA
FAX: 021 3468177
Mobil: 0724825792
e-mail: sitex45@rdslink.ro
sitex45@evomail.ro
www.microsisteme.ro

open engineering
www.open-engineering.com

EURO HEAT PIPES
www.ehp.be

Background

Rapid Manufacturing (RM) is the production of parts in various materials directly from a 3D CAD file. RM is a so-called *Layer Additive Process,* which means that the parts are constructed with micrometer thin layers. This layer-by-layer production approach provide designers with unprecedented geometrical freedom when optimizing properties and functions of their products. Furthermore, RM supports batch sizes down to a single part, since no special tools are needed.



http://rm-platform.com

Further Information

Please take a look at:

http://compolight.dti.dk

Project coordinated by the Danish Technological Institute, Olivier Jay:
E-mail: oja@dti.dk

Funding

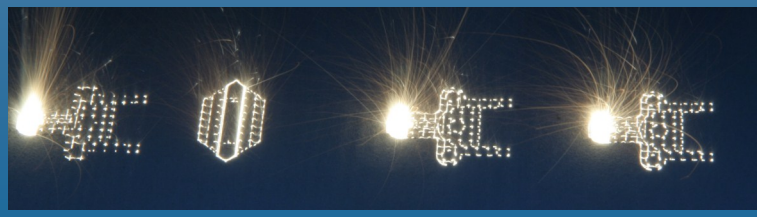
CompoLight is funded by the European Union within the 7th Framework Programme.

SEVENTH FRAMEWORK PROGRAMME

Project period: 11/2008 — 11/2011
Budget: 4.6 M€

COMPOLIGHT

FJI Plug
-
A case story



Objective

The purpose of CompoLight is to develop processes and methods which improve the design and manufacturing of three types of lightweight metal components:

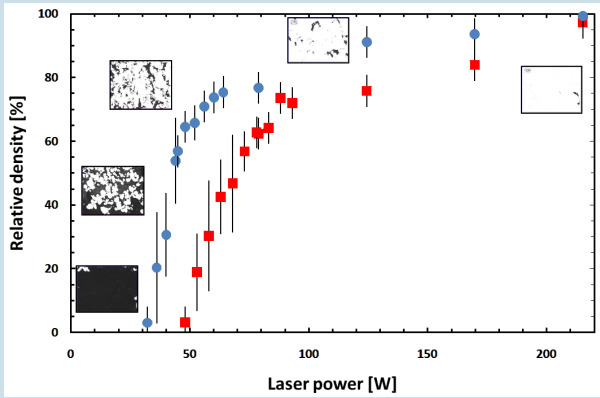
- Parts with interior canals.
- Parts with cavities .
- Porous parts.

CompoLight will:

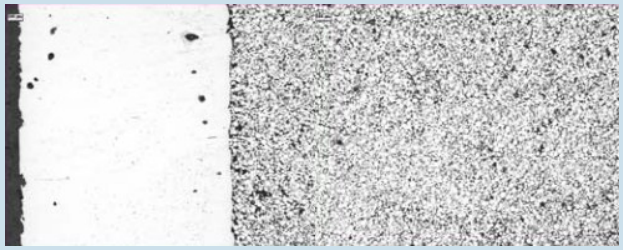
- Gain new knowledge about RM produced light metal items.
- Ease the introduction of RM concepts in the production.
- Increase the use of RM in the industry.
- Reduce the interval between idea and product.
- Reduce the costs and error output of RM.

Porous parts and AM

By tuning manufacturing parameters, the porosity of the final part can be controlled. The graph below show the porosity dependence on laser power and exposure time. The exposure times are 150 us (red squares) and 250 us (blue circles) respectively



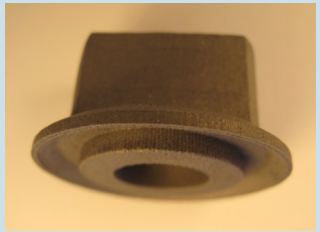
AM plus Sintering



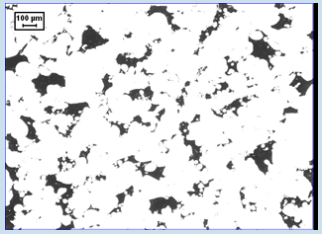
To further close the gap between the porosity distributions of AM and sintering, a combined approach has been developed. The idea is to use the AM technology to build a hollow shell and thereby trap loose powder in the core of the part. The part is subsequently sintered in an oven such that the powder core solidifies. With this approach the pore size distribution is fully determined by the initial powder and can be matched closely with that obtained by traditional sintering.

FJ Industries

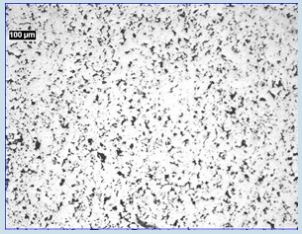
FJ Industries is a traditional sinter company. Custom tools are required for each new production series, but unfortunately they are rather expensive. It would therefore be highly advantageous, if prototypes and small series could be made in a another way and then move to sinter manufacturing when mass production is needed. One goal of CompoLight is to obtain AM parts with similar properties as sintermetal parts. A small plug has been chosen as demo.



AM vs. Sintering



Typical AM porosity



Typical sinter porosity

Even though the density is matched, the pore size distribution is different due to the different nature of the manufacturing process, e.g. the initial powder grain size distribution, the pressure applied in the sinter process and the complete grain melting in the AM process. Other material parameters like strength and elastic modulus, however, can be matched closely.

High-res CT scanning

To obtain detailed information about the porosity of sintermetal parts, a high-resolution CT scanning has been performed at the European Synchrotron Radiation Facility in Grenoble.