

Additive manufacturing of metals - A comparison of the most important processes

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Abstract:

The term "additive" (generative) refers to all manufacturing processes in which the material is added layer by layer to produce a component. This is in contrast to the classical subtractive manufacturing processes such as milling, drilling and turning, where material is removed to produce the final component. The layer construction principle makes it possible to produce geometrically complex structures, which cannot be realized with conventional manufacturing methods, or only at great expense. Whereas in the early days these processes, known as "rapid prototyping", were mostly used only for the production of models and prototypes, today this technology is increasingly being used as "3D printing" for the industrial production of components and products. Among the eight processes known today for 3D metal printing, LMD (Laser Metal Deposition) and SLM (Selective Laser Melting) are predicted to have the greatest potential[1,2,3]. The lecture will compare these two methods and show the limits and possibilities using application examples.

References

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- [2] B. Budde, G. Liedl, W. Rhomberg, C. Stiglbrunner, B. Wepner, Potenzialerhebung Lasertechnik, AIT-IS-Report im Auftrag des BMVIT (Projekt Nr. 84), 2014.
- [3] Roland Berger, Study Additive Manufacturing – next generation AMnx, (2016).

Lecturer:

Dipl.-Ing. Dr. mont. Wolfgang Waldhauser studied materials science at the University of Leoben, where he also wrote a PhD thesis in the field of surface and coating technology. Since 1998 he has lectured at the FH JOANNEUM Kapfenberg in the fields of materials science and production engineering. In 1999 he started his career as development engineer, project manager and research focus manager at the former Laserzentrum Leoben of JOANNEUM RESERACH. From 2010 to 2016 Mr. Waldhauser headed the research group Functional Surfaces at the Institute of Surface Technologies and Photonics. Since 2016 he is head of the research group Laser and Plasma Technologies. His areas of work include laser- and plasma-assisted thin-film technology, nanostructured coatings, carbon based films, materials technology, laser thick-film technology, laser materials processing, additive manufacturing. Mr. Waldhauser is (co-)author of over 90 publications and inventor of four patents.