

Whitepaper

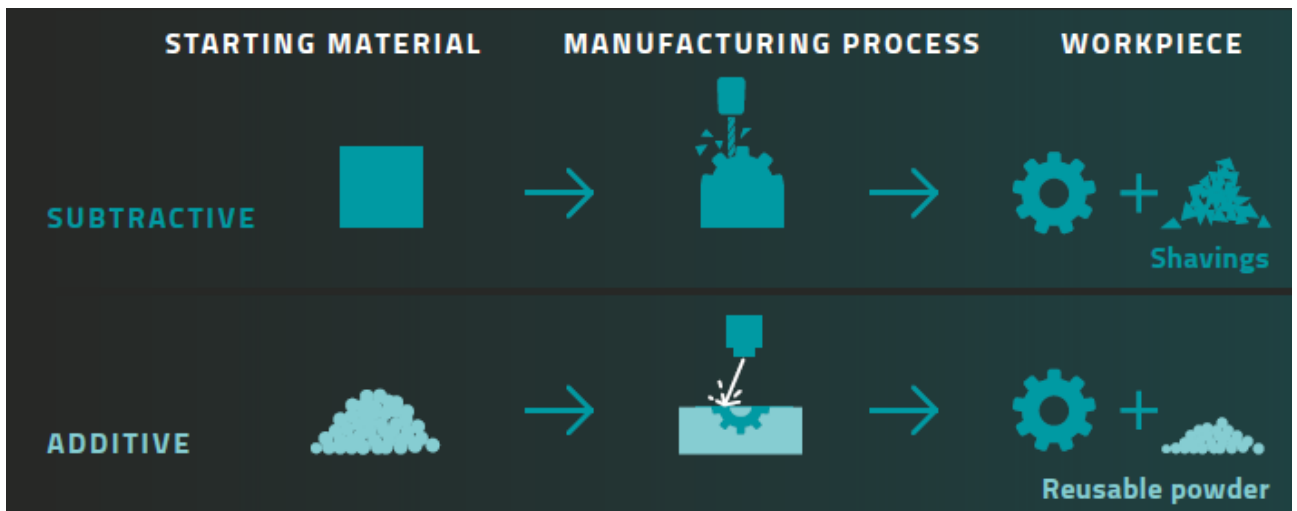
Advantages of additive manufacturing and why additive doesn't work without subtractive.

What is AM and why should I take an interest in it?

Many different terms - one topic: AM! Additive manufacturing opens up a world of new opportunities.



A workpiece is built up layer by layer in a powder bed. The laser fuses the powdered material being processed. The part is thus literally built up in a '3D' way. In addition to powder bed processes, technologies include axis-controlled and robot-controlled deposition welding (LMD/ DED) as well as other processes such as EBM, Binder Jetting and Cold Metal Fusion.



What are the advantages of additive manufacturing?

In the past, it was primarily used to produce prototypes but today, additive manufacturing is used in many industries for (small and medium) series manufacturing. With additive manufacturing, you can tap into new markets, sectors, and customers. The limits on the potential for innovation are also boundless. The innovative process has several clear benefits:

- ✓ Manufacturing of complex geometries such as lattice structures, internal cavities, and functional integration - all within a very short time
- ✓ Lightweight construction - with FEM (Finite Element Method) and topology optimisation the component can be optimised for saving material, weight, and costs
- ✓ Spare parts management of tomorrow - print what you need, when you need, where you need
- ✓ Functional prototyping - produce prototypes quickly and easily and optimise the component for series production
- ✓ Merging of assemblies - covering as many technical functions as possible with as few components as possible and dispensing with critical joining technologies
- ✓ Processing of difficult-to-machine materials - simply printing instead of machining



Further advantages of AM

With AM as indirect manufacturing, auxiliary materials, moulds, special tools, clamping devices, protective covers, repairs, and spare parts can be produced quickly and cost-effectively.

Further advantages of additive manufacturing are:

- ✓ Shorter lead times for faster delivery times
- ✓ 'On-demand' manufacturing for less warehousing
- ✓ 'Time-to-market' for faster product launches
- ✓ Decentralised manufacturing
- ✓ Flexibility and sustainability in production
- ✓ 100% reproducibility
- ✓ First-time-right - even the first print delivers optimised components



Advantages of laser metal deposition (LMD/DED) in particular:

- ✓ Hybrid manufacturing: Welding of previously incompatible materials. Fast conventional production of blanks, which then can be customised.
- ✓ Repairs: Scan a defective component using a line scanner and perform a target/actual comparison in CAD. Welding on the damaged/worn areas and quality assurance options in the closed loop system.
- ✓ Coating (high-speed welding): For better surface properties, heat and/or corrosion resistance.



Why additive doesn't work without subtractive

Almost every additively manufactured functional component requires further processing. For example, to optimise surface accuracy, produce functional surfaces or remove support structures. The reverse sequence is also conceivable: A component is first manufactured by machining and then additively coated or complex structures are deposited on a simple basic structure. Many combinations of both manufacturing processes are conceivable. That's why it's not 'either or', but always 'and'.





AMbitious – Your practical partner

AMbitious provides additive manufacturing training, software and consultation. We offer tailored support to assist you with the manufacture of 3D-printed parts along the entire AM process chain – from the strategy all the way through to implementation and certification. Our range of services comprises training courses on additive manufacturing as well as Siemens NX software and training. As a Siemens NX AM Expert Partner, AMbitious powered by toolcraft provides training on Siemens NX and can support you with the implementation and use of Siemens NX software together with its modules along the entire AM process chain.

For course dates and more information on our services, please visit www.AM-bitious.de/en.

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