Device for fast parallelized additive manufacturing

Additive manufacturing ist fast becoming one of the most important manufacturing techniques. While ideal for prototyping, it is now also being used for the serial production of e.g. automotive and aerospace parts and of consumer goods such as shoes etc. Printers have become cheaper and more accurate, printing materials more varied, and competence and knowledge much greater. However, compared to older techniques like injection moulding, additive manufacturing ist still painstakingly slow, preventing a broader use in serial production.

New Method for a faster and more versatile FFF printing process

IP RIGHTS
Granted German Patent
2020

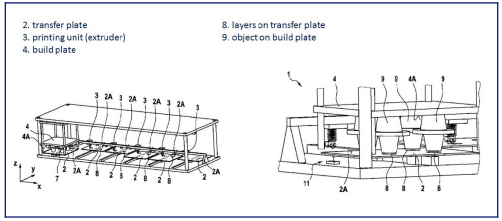
A team of researchers from Technical University of Munich have designed a new method for the parallel printing of separate layers in additive manufacturing. Combining the separate layers when still warm and adhesive allows faster completion of the printed object as well a a potentially stronger layer-to-layer adhesion.

01 Several layers can be produced simultaneously, thus speeding up the production process

02 Challenging geometries such as overhang structures can be printed without support structures

03 Multi-material printing can be done by different printing units to yield locally different material properties

04 Ideal method to functionalize objects (conductivity, sensors & actuators)



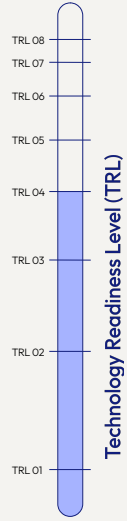
Left: Schematic sketch of parallel transfer plates and build plate. Right: Schematic sketch of objects on build plate and layers on transfer plate shortly before transferring the layers.

CHALLENGE

In additive manufacturing, e.g. in Fused Filament Fabrication (FFF), the build-up of the manufactured object is often slow, because each layer has to be completed before the next can be started. Since additive manufacturing is now no longer used for mainly prototyping, but also for serial productions, saving time during the manufacturing process is crucial in order to reduce production costs. Individual printing units are limited in their potential to speed up.

INNOVATION

The invention describes a Fused Filament Fabrication (FFF) manufacturing device for the layered production of objects. Its main feature is the multiple number of printing units (extruders), each with a separate transfer plate. The printing unit extrudes at least one layer onto a transfer plate, which then moves into position. The build plate, which is rotated 180 degrees relative to the transfer plate, then moves into position over the transfer plate. Afterwards the build plate takes over the layer from the transfer plate by means of controlled pressure and temperature in order to produce the object.



01 Basic principles observed · **02** Technology concept formulated · **03** Experimental proof of concept · **04** Technology validated in lab · **05** Technology validated in relevant environment · **06** Technology demonstrated in relevant environment · **07** System prototype demonstrated in operational environment · **08** System complete and qualified

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An invention of **Technical University of Munich**

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