



AUTOMATED SUPPORT REMOVAL FOR SLM COMPONENTS

Task

A major obstacle to today's use of the SLM process in industrial serial production is the great manual effort involved in finishing the component, in particular, the removal of its support structures. According to the present state of the art, the components are first separated from the construction platform by means of a sawing or wire cutting process. In the next step, the support structures are manually detached from the component with simple hand tools and the surfaces are post-treated as required. However, this results in a great time and expense and is, therefore, unsuitable for series production.

Within the scope of a current research project, Fraunhofer ILT examined various automated process approaches and assessed them in terms of their feasibility on SLM-machined geometrical structures made out of AlSi10Mg.

Method

A cost-benefit analysis according to the VDI 2221 standard was carried out to preselect potentially suitable process approaches. The designs with the greatest potential were then tested on the laboratory scale for their feasibility.

Results

In particular, the process approach »chemical removal« offers great potential for use in series production. The method can be used for the complete removal of various external and internal support structures, regardless of their geometry. In particular, however, a tree-like support structure is suitable for this method's operating mechanism. The method has other advantages: It operates independently of the pieces processed, several machining steps can be run in parallel and it smooths the surfaces once the supports have been removed. Currently, the process is being tested on AlSi10Mg.

Applications

Due to the simple plant technology, the process can be applied both in small scale and for industrial series production, for example in the automotive industry. When suitable etching agents are selected, the process can also be applied to other materials and, thus, made accessible for a wide range of industrial applications.

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Task

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- 3 Internal and external SLM-machined geometrical structure.
- 4 Geometrical structure whose supports have been removed by the new process.