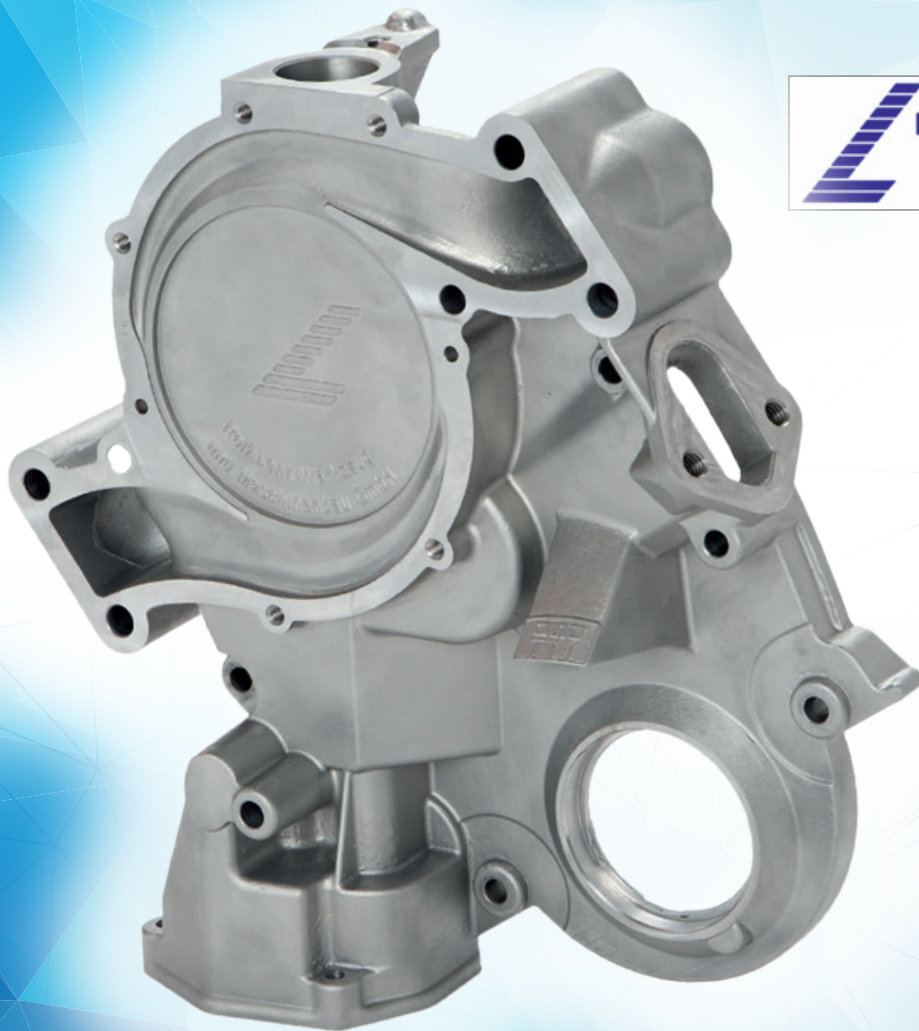


Case Report

Cover for the control box of a Cadillac Eldorado



**New business ideas through
3D-Printing using the example
of spare parts supply**

Product optimization at
Rolf Lenk Werkzeug- und
Maschinenbau GmbH

COMPANY PROFILE

Rolf Lenk Werkzeug- und Maschinenbau GmbH

Rolf Lenk Werkzeug- und Maschinenbau GmbH is a family-run tool and machine manufacturer that is typical for the German "Mittelstand". The company currently has 25 employees and three apprentices. The management attaches great importance to the in-house training of the junior staff.

The tool and machine manufacturer from Ahrensburg near Hamburg, Germany, is specialized in the manufacturing of tools, machines, and components for small and medium enterprises from different industries. Due to the high quality and preciseness Lenk has achieved an excellent reputation and has become a well-known supplier for many high-grade industries. In most cases, products are manufactured to customer specifications. If required, the company also supports its clients with construction and technical drawing.

CURRENT SITUATION / CHALLENGES

The way from classic tool and machine manufacturing to high-tech production

Rolf Lenk Werkzeug- und Maschinenbau GmbH and SLM Solutions are connected by a unique story. First contacts were established in 2006. At that time, SLM Solutions was in search of a tool manufacturer to construct the prototype of a buildchamber for the SLM®250 and plant manager W. Glahner commissioned Rolf Lenk Werkzeug- und Maschinenbau GmbH with the construction and production of the prototype.

The tool and machine manufacturer eroded the buildchamber from one single metal block with high precision. SLM Solutions was absolutely enthusiastic about the high quality and precision. All fits had been so precisely executed that reworking was not necessary. And from this first contact, a lasting business partnership soon developed.

Rolf Lenk was integrated into the entire production process of new manufactured parts for prototypes and small series. Based on technical drawings parts for the coater and the SLM®500 were developed, implemented and further reworked.

Designation:

**COVER OF A
CADILLAC ELDORADO**

Industry:

**TOOL AND MACHINE
CONSTRUCTION**



Manufactured on:

SLM[®] 280 TWIN

Material:

AlSi10Mg

SLM® SOLUTION

New business ideas through additive manufacturing

And development progressed! The deep insights into the additive manufacturing using the SLM® technology inspired Lenk to try new production techniques. A customer request in 2013 then resulted in the order of their first SLM®280. Today, Lenk produces prototypes and parts for small series as contract manufacturer. The customers come from areas such as medical technology, tool technology, automotive, engine technology, and underwater technology.

One example from the area parts supply may represent many others: the cover for the control box of a Cadillac Eldorado, model of 1967. More and more frequently, customers ask Lenk Werkzeug- und Maschinenbau GmbH to reproduce some spare parts for which there are no construction plans or cannot be found. And Lenk has developed its own method specially for such cases. First, the damaged part is scanned completely using a 3D scanner. The recorded data are then transferred into a CAD drawing and converted into the original state using a remodeling process. The preparations required for the control box cover amounted to 21 hours. And then additive manufacturing on an SLM® machine commenced. The newly created CAD data are read-in and produced using an aluminum alloy (ALSi10Mg). Using two parallel lasers for the reproduction of the 2.32 kg part, the SLM®280 requires 42 hours. The final fine tuning required another 13 hours. In total 75 hours were necessary to create this first new spare part.

The effort for the next identical components was further reduced to 55 hours. However, this major breakthrough for Rolf Lenk Werkzeug- und Maschinenbau GmbH was not limited to the oldtimer market. Many industry branches had similar problems: they were no longer able to use proven machines and systems because spare parts were no longer available.



Fig. 1
MAZAK five-axis manufacturing system
VTC 800/30SR



Fig. 2
Precision cutting with the MAZAK
manufacturing system



Fig. 3
View into the production hall:
Additive manufacturing using two SLM®280
machines and one SLM®500 machine

This new solution approach gives rise to the hope to be capable to manufacture required spare parts in 100% of all cases.

Today, a SLM®500 and a further SLM®280 are deployed at Rolf Lenk Werkzeug- und Maschinenbau GmbH in the manufacturing process. Gregor Sodeikat, managing director at Rolf Lenk Werkzeug- und Maschinenbau GmbH, cannot imagine his company without the innovative technology of additive manufacturing: "As a classic medium-sized company we are always open to new technologies. Therefore, we were immediately enthusiastic when we got to know additive manufacturing as latest technology in the area of metalworking. The SLM® technology gives us the opportunity to address new customer segments, to optimize and develop new products. Now our company can meet many customer expectations; we are well-positioned, future-oriented and fit for the next generation."

SUMMARY

Cover for the control box of a Cadillac Eldorado

- Knowhow from the area of classic tool and machine manufacturing inspires developments of the systems engineering for additive manufacturing
- New business areas and customer segments through 3D-printing
- Product optimization through additive manufacturing
- Small-series production of system components for manufacturing
- Rebuilding of spare parts without construction drawings



About SLM Solutions

The Lübeck-based SLM Solutions Group AG is a leading provider of metal-based additive manufacturing technology. SLM Solutions focuses on the development, assembly and sale of machines and integrated system solutions in the field of selective laser melting.

SLM® technology offers diverse options in the metal-based additive manufacturing of parts, such as a new design and geometric freedom, lightweight construction through the reduction of metal part weight, significant advantages in terms of production speed and the manufacturing of internal undercut parts in low quantities.

Our products are utilized globally by customers from the most varied sectors, particularly in the aerospace, automotive, tooling, energy and healthcare industries, as well as in research and education.

They particularly value the following advantages of our technology partnership:

- Highest **productivity** using patented multi-laser technology
- Highest material density and **part quality** through our innovative gas stream management
- Completely closed **powder management** in an inert gas atmosphere
- Cutting-edge process monitoring using various **quality control modules**
- Multilingual open **software architecture** with customer adaptability
- Ultracompact **modular design**
- Long-term and **confidential customer relationships**
- **A technological leader and pioneer** in metal-based additive manufacturing with decades of market experience

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