



CASE STUDY

HIRSCHVOGEL TECH SOLUTIONS AND NIKON SLM SOLUTIONS

INNOVATIVE SOLUTIONS WITH 3D PRINTING AT
HIRSCHVOGEL TECH SOLUTIONS



HIRSCHVOGEL AUTOMOTIVE GROUP

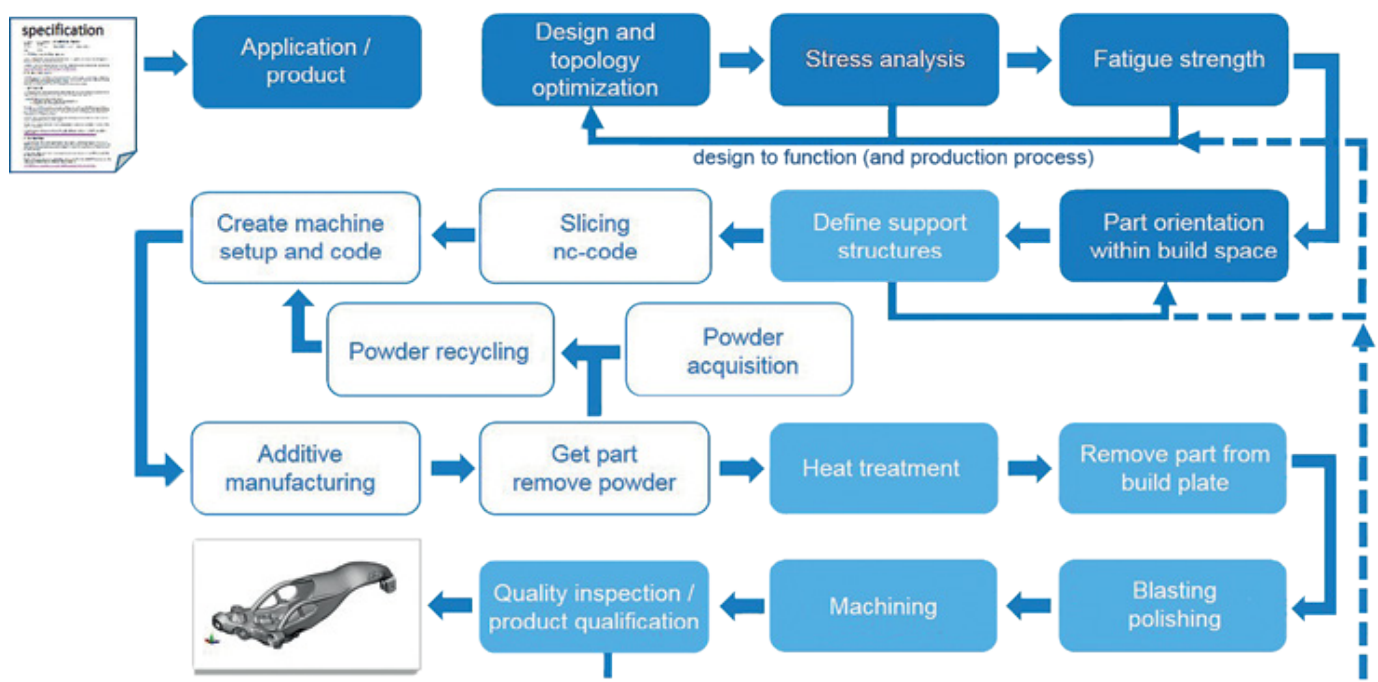
As a global automotive supplier with around 5,300 employees in nine plants on three continents, the Hirschvogel Automotive Group answers to the new questions arising from ever more stringent requirements. A parts for the automotive industry, among corresponding level of commitment and others.

The vision of the company is to achieve continuous improvement and provide expert answers to the new questions arising from ever more stringent requirements. A corresponding level of commitment and passion goes into every product. As a creative development partner, the Hirschvogel Automotive Group draws on its development know-how to make an active contribution to achieving the technical and economic goals of its customers.

PART DEVELOPMENT WITH A FOCUS ON THE ENTIRE PROCESS CHAIN

Development work at Hirschvogel Tech Solutions is always carried out based on an integrated approach, with a focus on the entire process chain. In this way, innovative and technically sophisticated solutions are commercially viable.

To gain maximum benefit from attractive solutions, including additive manufacturing, productive use of bionic methods is implemented, drawing on structures developed by nature over millions of years and applying them to the areas of engineering and technology.



STEERING KNUCKLE DEVELOPMENT

This approach was adopted on a steering knuckle, where it was possible to achieve a 40% weight saving in the neck area compared to the conventional forged part. All the requirements demanded of the part were fulfilled, taking into account the given assembly space. To do this, specially developed methods and specifically adapted CAx systems were used. Part design was carried out with a view to later production, allowing the part to be manufactured without the many additional internal support structures that would otherwise be required. Initially, a number of part variants was developed based on solutions from nature. These variants were then assessed before selecting those which were calculated and verified to best fulfil the given boundary conditions.

The skillful positioning of the part, which is almost 600mm in length, means that it can be produced easily on an Nikon SLM@500 selective laser melting system. It was also possible to produce the part with minimized support structures, and completely without internal supports, resulting in low post-processing effort.

Tests carried out on tensile and notched bar specimens built in the same process showed results matching the forecast values.



Fig. 1:
Selection/assessment of design approaches



Fig. 2:
Part structure with load-adapted supports



Fig. 3:
FEM calculation

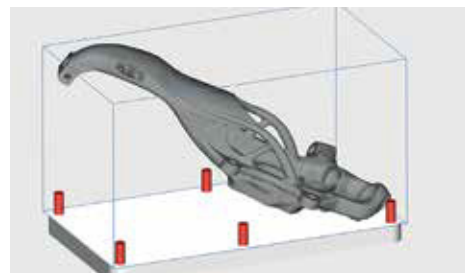


Fig. 4:
Precise build plate orientation

AUTOMOTIVE STEERING KNUCKLE

- Global automotive supplier with longstanding experience in serial production
- Part development is based on an integrated approach taking the entire additive manufacturing process chain into account
- High level of development expertise in lightweighting, as well as in the application of designs based on bionics
- Material savings of 40% compared to the conventional forged part
- Production requiring few support structures leads to reduced post- processing effort



Selection of the Part Spectrum of Hirschvogel Tech Solutions



Fig. 5:
Tong with structure adapted to the production process and loads



Fig. 7:
Tool with internal cooling



Fig. 6:
Spray nozzles



Fig. 8:
Housing





HIRSCHVOGEL TECH SOLUTIONS

As a brand of the Hirschvogel Automotive Group, Hirschvogel Tech Solutions is available as a competent service provider for part development and additive manufacturing through the combination of three service components part development, additive manufacturing and materials failure analysis the company supports its customers with an optimum know-how package for developing innovative products and high strength components Hirschvogel Tech Solutions is an innovation partner and solution provider in many application areas that extend far beyond forging and the automotive industry

NIKON SLM SOLUTIONS

Nikon SLM Solutions is a global provider of integrated metal additive manufacturing solutions. Leading the industry since its inception, it continues to drive the future of metal AM in every major industry with its customers' long-term success at its core. Nikon SLM Solutions is home to the world's fastest metal additive manufacturing machines boasting up to 12 lasers and enabling build rates of <math><1000\text{ccm/h}</math>. With a portfolio of systems to suit every customer's needs, along with its team of experts closely collaborating at every stage of the process, Nikon SLM Solutions leads the way on return on investment with maximum efficiency, productivity, and profitability.

Nikon SLM Solutions believes that additive manufacturing is the future of manufacturing and has the desire and capability to take its customers there right now.

Nikon SLM Solutions is a publicly-traded company headquartered in Germany, with offices in Canada, China, France, India, Italy, Japan, Singapore, South Korea, and the United States.

Further information is available on www.nikon-slm-solutions.com