

## **3D PRINTING IN THE AUTOMOTIVE INDUSTRY**

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The automotive industry has always been an industry where new technologies are being introduced and improved at a rapid pace. Greater competition forces us to look for new technological solutions, and digital technologies are having an increasingly strong impact on the automotive industry. 3D printing acts as an optimal development tool, providing a fast and cost-effective manufacturing process for parts [1]. Although prototyping remains a key application of 3D printing in the automotive industry at the moment, companies will increasingly explore and introduce new areas of its use in the future. 3D printing, also known as "additive manufacturing", is a technology for creating full-volume three-dimensional objects [2]. 3D models for this process can be created either manually using computer graphic design or through 3D scanning.

Since 3D printing provides engineers with the opportunity to quickly develop structures, designers are provided with significant flexibility, which allows them to test various options. 3D printing is a cost-effective way for automakers to produce custom parts. This technology is actively used in the production of luxury cars and in motorsport to create customized parts for both interior and exterior trim of cars. Thanks to 3D technologies, it is possible to produce complex parts with intricate geometric shapes, such as internal channels, thin walls and fine meshes, which are characterized by light weight and high strength.

One of the main obstacles to the introduction of 3D technologies in production remains the large volumes that are often required in the automotive industry. However, today industrial printers have become larger, the printing speed has increased, and the cost of materials for production has become more affordable [1].

When it comes to luxury, power and speed, few things can compare to Bugatti. The French supercar manufacturer is spending time and effort

on a range of innovative technologies, including 3D printing. The company's first step in this direction is a printer-printed brake caliper. The part has already passed road tests, it takes about 40 hours and about 3 kg of titanium to make it. This makes the caliper not only extremely durable, but also incredibly light. The financial weight of replacement components constitutes a significant portion of overall spending for vehicle producers and their associated networks. Traditional approaches frequently depend on large-scale manufacturing, resulting in longer wait times and increased costs. Conversely, additive manufacturing enables the creation of parts locally and as needed. This change in approach improves the balance between what is available and what is wanted. Moreover, AM's ability to make parts closer to where they are needed reduces delivery times for the final customer, improving how well things work and how quickly the automotive aftermarket can react. Using AM is a smart way to lessen the effects of old supply chain problems in how spare parts are handled.

In 2018, the Porsche automobile concern began using 3D printing in order to reduce the shortage of rare parts for rare cars. The company showed its customers a huge catalog of high-quality parts for rare cars at an attractive price. Additive technologies have great prospects for implementation in the automotive industry, as well as in other industries. The replacement of foundry and stamping production may soon be partially carried out by 3D printing technology. But due to certain disadvantages, a complete replacement cannot occur. The development of technology can contribute to improving the quality of production, as well as the rapid development of new branches of science, technology and business.

We will be able to verify the version that the use of 3D printers will speed up the production and design process of products only over time, when manufacturers of cars and other devices introduce the technology into production – the hypothesis has been partially confirmed.

### **References**

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