

Ultimaker

Reinventing efficient manufacturing using 3D printing



Since its foundation in 1914, Ford has driven innovation in automotive manufacturing. From pioneering the moving assembly line 115 years ago – also known as Fordism – to today's use of additive manufacturing, Ford is constantly thinking ahead to accelerate vehicle manufacture through increased productivity, ergonomics, and quality control.

Company

Ford Motor Company



Industry

Automotive

Challenge

Ford uses custom tools during vehicle production, often designed for one specific task and model. Creating these tools externally takes a lot of time and is very expensive.

Solution

A dedicated additive manufacturing team uses FFF 3D printing for a faster, more affordable solution with less hassle.

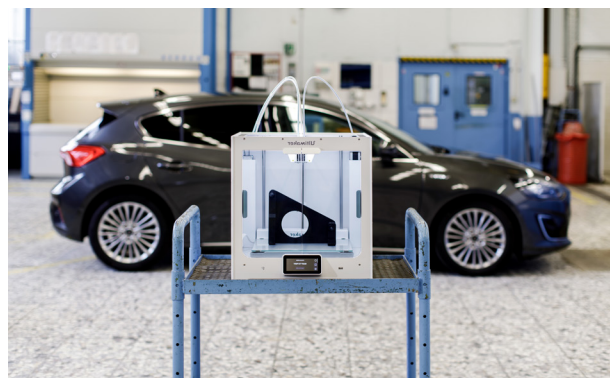
Results

- Cost and time savings
- Local manufacturing
- Increased line uptime
- Optimized tool ergonomics

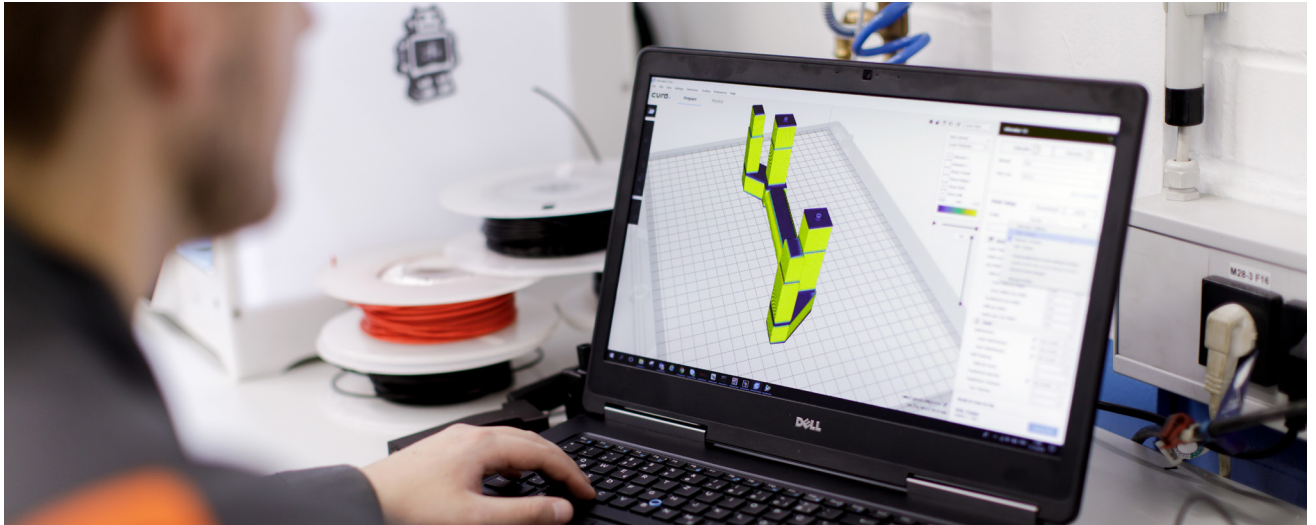
Ford – Introduction

While many companies start exploring the possibilities of additive manufacturing, Ford is once again a step ahead to keep their vehicles rolling off the production line quickly.

Ford's pilot plant in Cologne, Germany pioneers the creation of each new vehicle design before it goes into mass production. They have a complete small-scale manufacturing line, which develops cars up to several years before they go into production. Lars Bognar, Research Engineer at Ford's Research & Advanced Engineering team in Aachen, has been working on creating an optimized workflow to create jigs, tools, and fixtures for Ford's manufacturing process.



Tools are created at the pilot plant before going to mass production



Ultimaker Cura's easy interface enables anyone to create tools themselves

Adoption of 3D printing

Ford's employees use many custom tools during their vehicles' production. These are often designed for one specific task and model. Creating these tools externally takes a lot of time and is very expensive. To get tools faster, the team at Ford decided to pilot 3D printing as a possible solution.

A dedicated additive manufacturing team was founded, and they began a successful project using SLS technology. They had good results, but the prints needed some specific post-processing. That's why Ford started using FFF technology from Ultimaker. It provided an even faster, more affordable solution with less hassle. This way, not only engineers but also local workforces are able to use a 3D printer to create the tools that they need.

Creating tools, jigs, and fixtures

Many manufacturing plants implement 3D printing to optimize their current manufacturing process. However, by having a dedicated 3D workshop in the pilot plant, Ford is able to produce all the right designs before a new car goes into mass production. This gives the engineers at Ford more time to iterate the designs of all the custom tools. Ford wants to create tools which not only speed up the manufacturing time of the vehicles but also often have ergonomic benefits for the workforce. That's why it's important to Ford to be able to create the right design for the application.

Local manufacturing

By using Ultimaker 3D printers, local workforces can also 3D print the tools they need. Ford is placing Ultimaker 3D printers in factories all over Europe, such as in Spain, Italy, and Romania. The design team in Germany will supply the designs electronically, and the tools can be used the next day thanks to 3D printing.

But Ford is also going a step further. Using Trinckle's generative software solution Paramate, workers in these plants can generate jigs without any other experience in 3D design. The team in Cologne will create components they can use for the tools such as handles and magnet holders. The engineer will load the design of the car, add handles, an open space where they need to add a part to the car, and the software will generate the jig. This design can be sent directly to Ultimaker Cura and printed locally with their onsite Ultimaker S5 machines.



Trinckle's software enables workers to generate tools which can be directly sent to the Ultimaker 3D printer



One vehicle model alone uses over 50 custom 3D printed tools

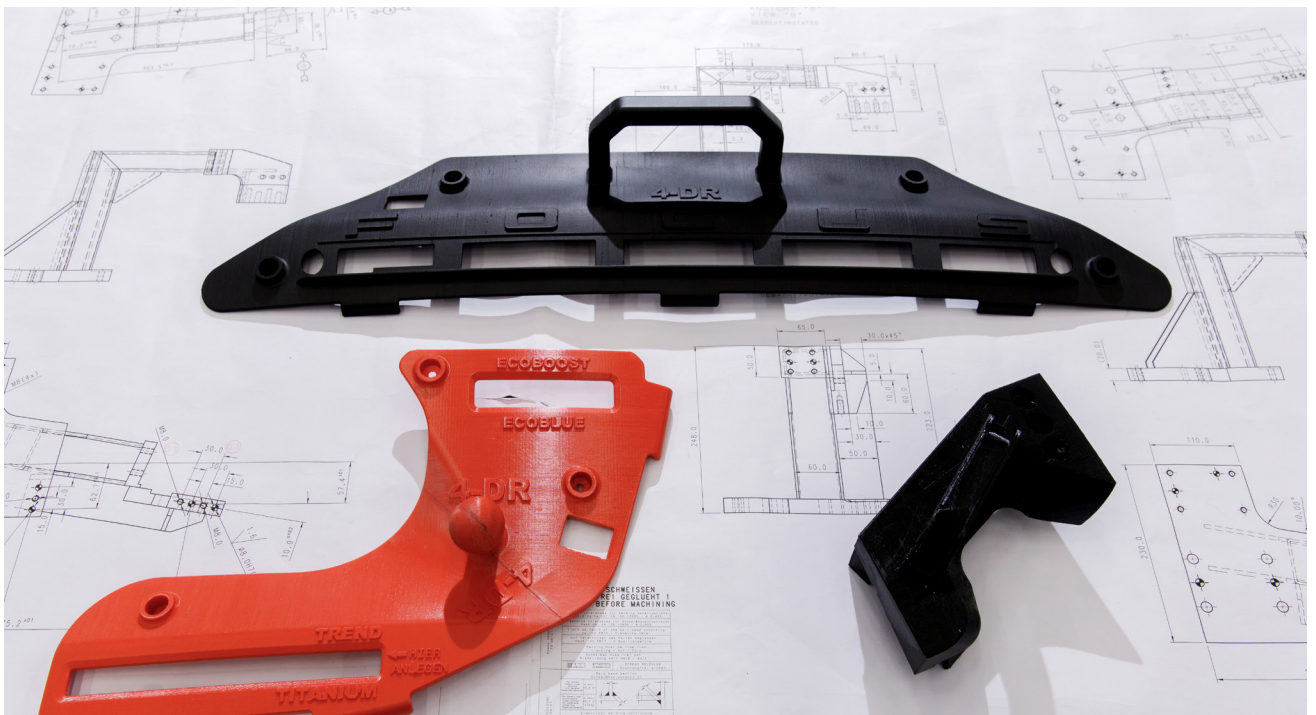
Benefits of 3D printing

So far, the pilot has already been very beneficial to Ford. Per custom tool, they save a considerable amount of money compared to traditional manufacturing or outsourcing. The Ford Focus alone is manufactured using over 50 custom designed tools, jigs, and fixtures. Ford is also looking at spare parts for production machines from the manufacturing line. By printing these parts, they drastically increase the uptime of the machines and the manufacturing line doesn't need to be paused for lengthy periods of time.

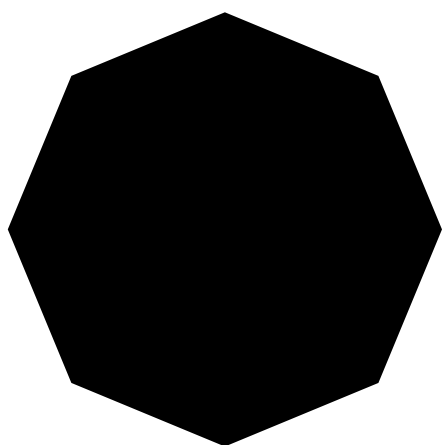
But 3D printing isn't just financially beneficial. Many of these tools have great ergonomic benefits for Ford's workforce. After prolonged use, traditional metal tools can start to feel extremely heavy, and can impact workers' health over time. Ultimaker's range of materials are often strong enough to replace metal tools, which makes life a lot easier for assembly personnel.

Future plans

Ford is expanding their 3D printing capabilities rapidly. While optimizing the workflow to create tools, jigs, and fixtures, they're learning more about the possibilities of 3D printing. Lars is not only looking to create tools and fixtures, but also exploring possibilities to create spare parts and final parts using 3D printing. "We want to make the next step, we also want to 3D print spare parts. We want to design for additive manufacturing and be able to print production parts for production vehicles".



Various 3D printed jigs and fixtures developed by the Ford pilot plant



About Ultimaker

Since 2011, Ultimaker has built an open and easy-to-use solution of 3D printers, software, and materials that enables professional designers and engineers to innovate every day. Today, Ultimaker is the market leader in desktop 3D printing. From offices in the Netherlands, New York, Boston, and Singapore – plus production facilities in Europe and the US – its global team of over 400 employees work together to accelerate the world's transition to local, digital manufacturing.

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