



“3D printing enables us to overcome barriers traditionally associated with CNC machining, helping us realize our most complex designs, as well as print bespoke tools on-demand. These capabilities allow us to improve our workbench flexibility, optimize our workflow and eliminate costly downtimes of the production line.”

Carlo Cavallini / GKN Group

With Stratasys advanced FDM engineering materials, GKN Driveline Florence redesigned a greasing nozzle tool offering improved functionality that helps prevent costly spills.

CASE STUDY

# Geared for Customization

## GKN DRIVELINE OVERCOMES PRODUCTION DOWNTIMES WITH 3D PRINTED MANUFACTURING TOOLS

Founded in 1759, GKN Group is a leading global engineering company with expertise spanning design to manufacturing complex service systems and technologies for world-renowned brands. The company’s global network includes dedicated divisions that serve aerospace, automotive, powder metallurgy and other industries. GKN Driveline is responsible for developing and manufacturing innovative automotive driveline solutions servicing over 90% of the world’s car manufacturers, including Maserati and Ferrari.

The GKN Driveline plant in Florence produces key transmission components for the Fiat Chrysler Automobiles Group. With in-house CNC machining at full capacity, the Florence division began outsourcing a high proportion of its tool development.

“We were constrained by a two- to three-week turnaround when outsourcing, which would delay the feasibility analysis of a new production tool. If additional iterations were required, this would further escalate lead-times and have a knock-down effect throughout the supply chain,” said Carlo Cavallini, additive Lead Process Engineer and Team Leader at GKN Driveline Florence.

### Driving Efficiency

The plant needed an alternative solution to accelerate tool production. Previous experience with Stratasys FDM® 3D printing steered the division into investing in a Stratasys Fortus 450mc™ 3D Printer for the ability to combine accuracy and robust materials with exceptional tolerance.

“Using FDM for automotive components provides us with greater design freedom, regardless of part complexity. It allows us to perfect designs early and has a significant impact on our turnaround time,” said Cavallini.

For example, the team used FDM to redesign a greasing nozzle tool. Typically, this part consists of a rudimentary bendable tube where a high volume of oil is forced into a single point inside the half shaft. Often susceptible to spills, the cleaning cost valuable time. In a bid to overcome this bottleneck, the team 3D printed an innovative greasing dispenser in ULTEM™ 9085 resin with multiple internal valves, offering improved grease distribution and eradicating spills.

“With the greasing nozzle, we reduced our lead-time by 70%. This has been crucial to streamlining the production cycle of the half shaft, enabling us to provide these final parts to customers faster than ever before,” said Cavallini.

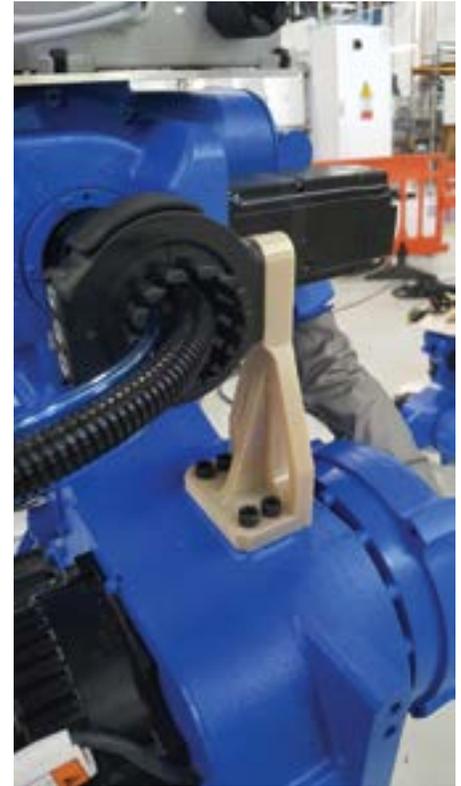
### 3D Printing Replacement Production Parts On-Demand

According to Cavallini, the benefits of 3D printing are felt across numerous applications, improving the team’s responsiveness across the division.

Recently the Florence division needed to replace a cable bracket that was missing upon delivery for a robot. “The cable brackets are designed to prevent the network of cables from interfering with the movement of the robot,” explained Cavallini. “Without this bracket, machine functionality cannot be guaranteed.”

Instead of waiting for the manufacturer to deliver the missing part, the team 3D printed a cable bracket in tough ULTEM 9085 resin.

“Originally a temporary measure, the 3D printed bracket exceeded our expectations in terms of performance and practicality,” said Cavallini. “The ability to quickly 3D print parts on-demand that, in this case, matched the performance of the metal tool is instrumental in reducing downtime. Considering we manufacture several thousand parts a week, it’s crucial our production line is always operational. 3D printing helps us ensure this business continuity.”



GKN Driveline Florence 3D prints replacement production parts on-demand that can endure prolonged use without fatigue.



GKN Driveline Florence is testing a range of new tooling applications on their Fortus 450mc, including bespoke end-of-arm tools.

## Dynamic Innovation

GKN Driveline Florence is exploring more ways 3D printing can expedite workflows. The company is testing a range of solutions where customization is paramount, including a tough end-of-arm tool tailored to move components through production stages.

Traditionally produced in steel, the end-effectors not only proved unwieldy, but could also be unfit due to CNC's design limitations. The team now 3D prints several bespoke end-of-arm tools. With greater customization, the 3D printed parts can pass extensive feasibility analyses and help replace a cumbersome process with a seamless, unmanned workflow, saving two months.

Beyond the substantial time savings, the real value of FDM 3D printing is its ability to dramatically improve business performance. With more parts designed with additive manufacturing in mind, a plethora of new tooling applications can be optimized with the technology.

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