

Case study

FICEP S3 reengineers paint machine with help from HP 3D Printing technology



How HP's 3D Printing technology enables parts that are lightweight, allowing faster movements with increased precision

INDUSTRY SECTOR

Industrial Machines

OBJECTIVE

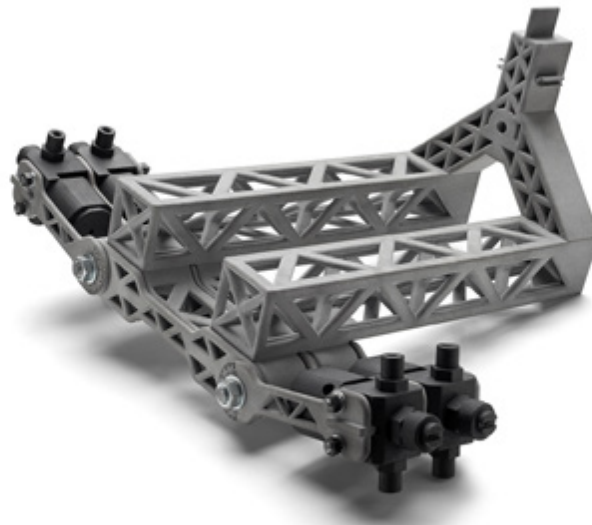
Utilize HP's Multi Jet Fusion technology to manufacture parts for a line of automatic paint machines that are lighter, stronger, and allow more precise movements than parts made using traditional manufacturing processes like injection molding and machining.

APPROACH

Identify the parts that would benefit from reengineering, redesign them for additive manufacturing, test them for strength, temperature and chemical resistance, and if successful, qualify them for production using HP's 3D printing system.

TECHNOLOGY

HP Multi Jet Fusion
HP Jet Fusion 3D Printing Solution



Data courtesy of FICEP S3 S.L.

Summary

FICEP S3 is partly owned by FICEP S.p.A., a company that manufactures machines and develops production management software for structural steel fabricators. It is a global leader in many of the niches where it competes. For example, FICEP S.p.A. currently controls approximately 75% of the world market for structural steel and plate processing systems.

FICEP Steel Surface Systems (S3) is a high tech engineering and research & development company which operates worldwide within the FICEP group. By investing in and owning the complete manufacturing process, FICEP S3 is able to optimize its processes and offer extremely high quality equipment. It also enables FICEP S3 to be more flexible and innovative in its approach, enabling rapid prototyping and a faster response to variable market demands.

FICEP S3 also provides installation and maintenance services for steel fabricating equipment. In addition, it provides after sales service and spare parts, including 3D printing of parts using technology from HP.

The daVINCI Automatic Paint Line primes and paints structural steel. In its development, FICEP S3 faced several constraints and decided to see if they could be resolved using HP's Jet Fusion 3D printing solution.





Challenge

“We spent a lot of time trying to figure out how to make some the parts,” says FICEP S3 CEO, Nuno Neves. “It was extremely complicated to machine some of them due to limitations with current machining technology. It just wouldn’t work. In other cases we were challenged with the limitations of injection molding. Around that time I was invited to see HP’s 3D printing technology and I immediately wondered if it could help solve our problems.”

In some cases, the parts used in the Automatic Paint Line were too complex for machining. In others the weight of producing them in metal put too much stress on the rest of the system.

The company also looked at injection molding, but also found it to be less than optimal. Part of the problem was complexity. In one example a mold would have needed 11 different components just to be manufacturable. Further exacerbating, there was the fact that each time a change was required, molds would have to be remade.

The other problem was strength. With a traditional process like injection molding, they couldn’t make parts that were strong enough to support the rigors of daily use - especially because of the weight problem associated with other parts.

Solution

“There was a cumulative effect,” says Mr. Neves. “To make the line operate as efficiently as possible, we needed to create several parts that together were of lighter weight, permitting faster movements and more precise control. The parts also needed to be mechanically strong, and resistant to the chemicals and fluctuations in temperature that are common in an industrial environment.”

Once they received their HP Jet Fusion 3D printer, the team at FICEP S3 spent approximately 3 months testing materials and output. They subjected parts to extreme heat and cold repeatedly. They also confirmed that the resolution and surface finish would meet their needs.

Once they were satisfied that parts would meet their standards, they redesigned them to get the maximum benefit from HP’s additive process. They began with a robotic arm that’s used to apply paint. They fully optimized the part’s geometry and were able to reduce it in size from 1.5 meters down to 300 millimeters. This allowed for shorter acceleration and deceleration, improving the line’s overall precision.

FICEP S3 then began redesigning the brackets that supported the robotic arm. All told they identified over 40% of the parts in the Automatic Paint Line that could be improved, including pulleys, axles and structural components. Each was redesigned to optimize it for production using Multi Jet Fusion.

With all of the parts tested and approved, they were ready to go to production.



“With HP’s Multi Jet Fusion technology we could produce parts quickly enough to keep up with demand.”

– Nuno Neves, FICEP S3 CEO.



Result

“With HP’s Multi Jet Fusion technology we could produce parts quickly enough to keep up with demand,” says Mr. Neves. “Other technologies would take 12 hours to produce one part, now we can produce 100 parts in that time.”

With their new HP Jet Fusion 4200 3D printer, FICEP S3 was able to produce the parts they needed to manufacture the daVINCI Automatic Paint Line. It also enables them to manufacture spare parts quickly and at a low cost, without having to maintain a large inventory.

HP’s technology also allows FICEP S3 to customize parts for specific needs. The robotic arm, for example can now be easily customized for different painting applications.

Reducing the size and weight of the parts also allows them to use smaller mass produced parts like motors, pulleys and belts. Together, this has opened up a lot of space inside the

machine, allowing FICEP S3 to easily add new features. It has also reduced the overall weight of the machine. So much so that FICEP S3 estimates it yields a 72% savings in energy when compared with competitive machines.

FICEP S3 is currently developing a new version of the Automatic Paint Line. With HP’s Jet Fusion 3D printing technology, they aim to replace as much as 40% of the machine’s traditionally manufactured parts.

FICEP S3 is also looking far beyond their own internal needs. With their skills in engineering, design and production, other companies have expressed interest in using their services. HP’s Multi Jet Fusion 3D printing technology will play a large part in fueling their growth.

“While we’ll continue to support our company’s current needs, FICEP S3 has a real opportunity with 3D printing, says Mr. Neves. “I believe that within 3 years, outside work for new clients could account for 90% of our business.”



“Other technologies would take 12 hours to produce one part, now we can produce 100 parts in that time.”

– Nuno Neves, FICEP S3 CEO.

Customer at a glance

Application

3D Printing for Final Part Production

Hardware

- HP Jet Fusion 3D 4200 Printer

Accessories

- HP Jet Fusion 3D 4200 Processing Station with Fast Cooling
- HP Jet Fusion 3D Build Unit
- HP Jet Fusion 3D External Tank

Software

- HP SmartStream 3D Build Manager
- HP SmartStream 3D Command Center
- 3MF

HP services

- Next-business-day onsite support
- Next-business-day spare parts availability, thanks to HP's global reach
- 3D printing productivity and professional services

Learn more about HP Multi Jet Fusion technology at

hp.com/go/3DPrint

Connect with an HP 3D Printing expert or sign up for the latest news about HP Jet Fusion 3D Printing:

hp.com/go/3Dcontactus

