

BLACKBELT

Jigs and Fixures



User Case – Ubbink

With the Blackbelt-3D printer, Ubbink introduced a new concept for solving production issues and discovered numerous process improvement possibilities using 3D printing. This paper explains how with help of the unique properties (long prints, series & none supported overhangs) of our Blackbelt 3D printer, improvements concept are implemented at Ubbink.

About Ubbink

Ubbink develops and manufactures ductwork for sustainable HVAC solutions and roofing accessories, which help improve the indoor climate in new and existing domestic and commercial buildings and the health of those people living and working there.

Their solutions include:

- Ductwork for domestic and commercial heating systems including roof and wall terminals, chimney solutions, shared flue and cascade systems;
- Ductwork for domestic ventilation systems including roof and wall terminals, insulated mass flow ductwork, an air distribution system using semi-rigid ductwork and supply and extract valves;
- Roofing accessories including non-lead roof flashings.

Ubbink is part of the Ubbink Centrotherm Group, which has subsidiaries in the Netherlands, Germany, Belgium, France, United Kingdom, Italy, USA and China. The Ubbink Centrotherm Group is part of the Germany-based and SDAX listed Centrotec SE. The Centrotec group of companies forms an enormous, international knowledge network for sustainable HVAC solutions and roofing accessories for new and existing buildings.

Blackbelt-3D Use Case at Ubbink

At Ubbink's location in Doesburg in the Netherlands they have 2,5 years of experience with the Blackbelt-3D printer (as a filament they use PETG in their brand color "red"). Ubbink's management made the bold decision back in 2018 to invest in an initiative to try new and innovative ways to improve manufacturing productivity. Focus for the technical team are all factors that influence OEE¹ (Overall Equipment Effectiveness). A technical team has built up 3D competences throughout this time and has proven to management that 3D technology is of added value to run Ubbink's machines efficient and effective.

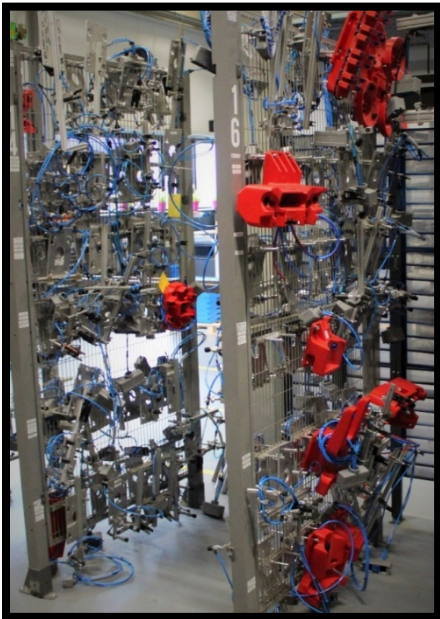


Blackbelt-3D printed Jig

¹ OEE% is a key performance indicator (Yield% x Uptime% x Cycle time performance%) for measuring the success of improvement initiatives such as those related to quality improvement and lean manufacturing.

At the Doesburg site, a wide range of machinery including over 18 injection molding machines, semi-automated assembly cells and an impressive warehouse with storage racks up to 20M high, on a floor space of 5.500 M² are available. It's technicians and engineers task to keep all machines operational and running 24hr/day. Ubbink experienced problems during the production runs. Traditional fixtures and jigs, made of an aluminum body work combined with suction cups, grippers, tubes and fasteners, appeared not always to do their intended tasks for 100% of the production time. The result was often that machine operators started modifying these traditional jigs and fixtures themselves to solve the issues. This was a none-desirable situation, as it caused the situation to get worse. Leading to more downtime of the equipment and molding machines and increased rejects.

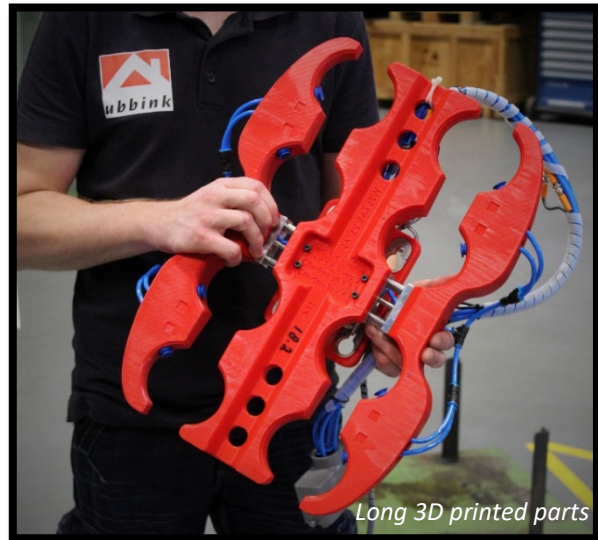
Starting-up a new production runs with modified jigs and fixtures led to even more valuable production time wasted. In addition, the organization ran into lead time problems with the replacement of custom made parts for the grippers of the jigs.



An in-house 3D printing capability was added to the companies toolset to address the issues with jigs and fixtures. Ubbink chose the Blackbelt-3D printer because it differentiates from other standard 3D printers. The unique advantages of long prints, series & non supported overhangs really offered more flexibility for technicians and engineers. Printing long and larger custom parts can easily replace the current, often fragile parts, with stable robust 3D printed jigs and fixtures. 3D printed jigs and fixtures turned out to be favorable way to go forward. Not only to solve the issues with jigs and fixtures (plan is to replace all with 3D printed versions), but it even inspired inhouse design solutions for semi-automated assembly cells and producing on demand lean equipment needed.

Key Findings #1 Learning Curve

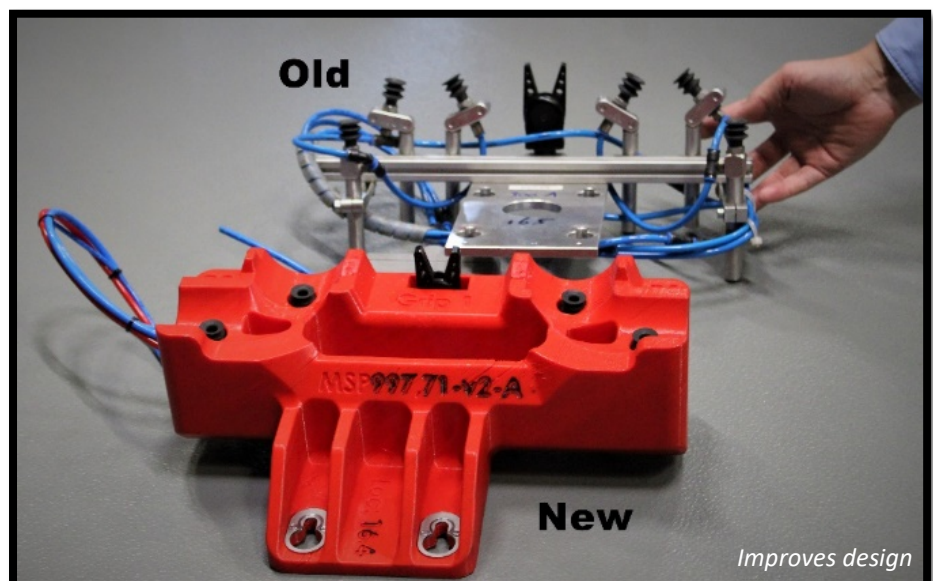
Gaining 3D knowledge and experience takes time. Time needed to be invested. Advantage of working in a tool shop is that CAD drawing are often already available. After some practice with CAD drawings and working with the slider software, Ubbink started the first 3D prints. As more prints followed, the quality of the prints increased significantly.



"The switch from no 3D knowledge to a skilled 3D engineer took about 4 weeks."

Key Findings #2 Inhouse Capability

Having a 3D printer at ones disposal ensures bottlenecks in production can be solved faster. Previously, all adjustments were carried out by external parties. Nowadays Ubbink follows up all customization requests to jigs and fixtures internally. This makes staff more responsible, stimulates lean & continuous improvements. It develops staff and makes people proud of their achievements.



Key Findings #3 Branding

Knowledge gained with the Blackbelt inspired Ubbink to use 3D printing also for different purposes. A fully automated self-3D printed assembly line for ventilation hoods is soon to go into production. When giving customers or suppliers a factory tour the 3D printed parts are recognizable and stand out cause of the Ubbink-red and the totally different design approach. Thus, delivering into Ubbink innovative brand image.

Conclusion

The original target set by management to improve manufacturing productivity has been achieved. Better, 3D printing results exceed all expectations. Ubbink realized considerable cost savings, since the machines have less downtime, less rejects and improved cycle times. All jigs and fixtures will be replaced by 3D printed versions.

Once the 3D capability was available and the first success story was shown to management, everybody was eager to exploit and discover more possibilities of the Blackbelt-3D printer. Ubbink started using the Blackbelt-3D printer for multiple applications at their Doesburg site. From custom made jigs and fixtures, to complete 3D printed assembly cell, to special storage trays.

The Blackbelt-3D printer and its multiple applications has now become a valuable addition to the Ubbink engineering tool set. Technical staff is righteous proud of all 3D-achievements.

Key Takeaways

- Ubbink is proud of 3D achievements
- Staff continuous to discover more 3D-applications
- Branding differentiator because of professional innovative use of 3D printed objects
- All jigs and fixtures will be replaced by 3D printed versions
- 3D printed jigs and fixtures improve manufacturing productivity (OEE%)