Additive manufacturing cuts costs by 80% and delivers a 50% time saving on robotic end-of-arm tooling

BDI Additive partnered with additive manufacturing material specialist DSM and JuggerBot 3D, a 3D-printing machine builder, to transform end-of-arm tooling (EOAT) and make manufacturing customizable, faster and low cost.

Customer

BDI Additive

Challenges

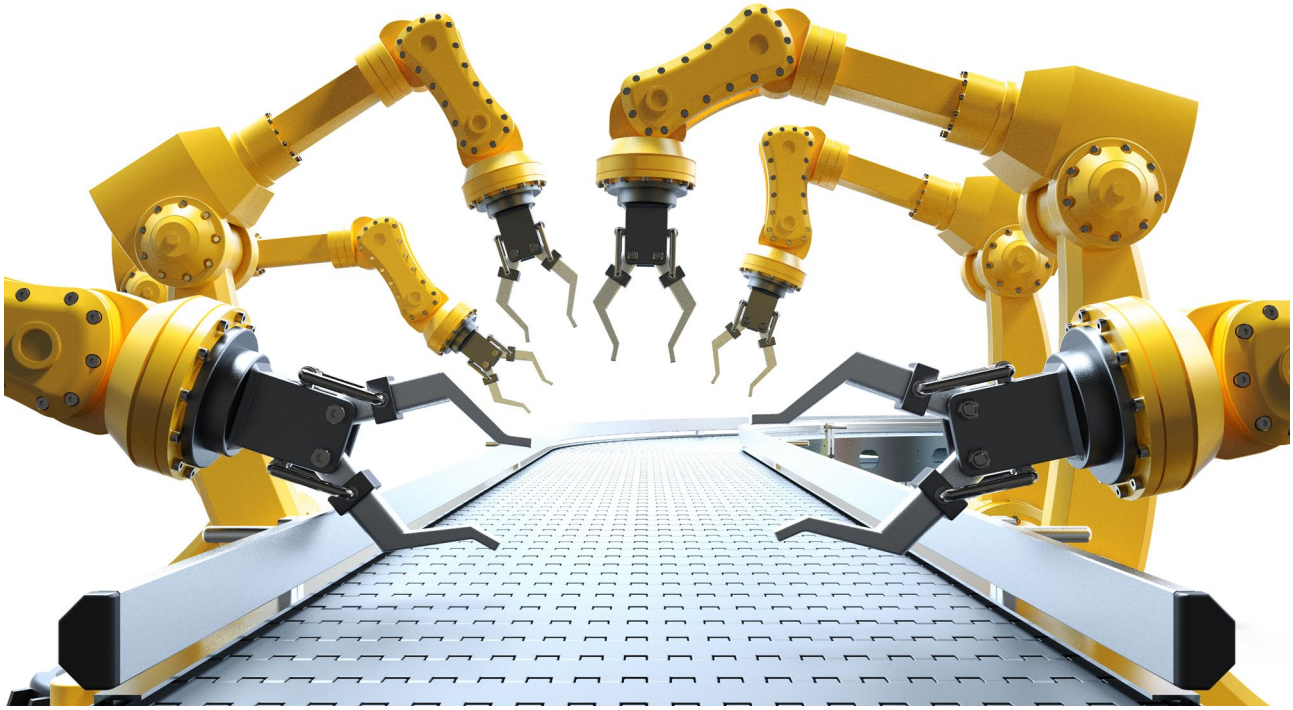
- Manufacturing shift from pre-engineered mass production to customizable, quick-change processes
- Traditional EOAT production costly and not fit for rapid process change
- Quickly produce EOAT at a low cost

Solution

- Partnership with JuggerBot 3D
- DSM fused filament fabrication materials

Benefits

- Costs cut by 80% and production time by 50%
- Customizable manufacturing process made faster and more flexible
- Cost-effective solution to produce EOAT for specific applications
- Improves spare part supply, mitigating production downtime



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"Producing custom EOAT on-demand, directly from a 3D CAD model holds great promise for future robotics and automation. The BDI Additive project, in partnership with JuggerBot 3D and DSM, shows the cost and time savings of using additive manufacturing to produce EOAT. Applications that require custom and interchangeable EOAT can be approached with a higher level of knowledge, improving efficiency and effectiveness."

Emily Hawthorn, Lead Additive Manufacturing Project Engineer, BDI Additive

Challenges

Robotics, effective at performing repetitive actions, play a vital role in everyday life, from automotive production to specialized medical operations. The market is worth billions of dollars and is rising rapidly. There is growing demand for product variety and personalization, and manufacturers need to adapt and change robotic systems in response.

End-of-arm tooling (EOAT) is a key part of robotic technology. It is the equipment that interacts with parts and components, typically at the end of a robotic arm, and may be used to manipulate pieces in a production line, handle tools or equipment or remove scrap. Traditional EOAT methods are cost effective when robots perform the same repetitive processes with the same EOAT device. The challenge for manufacturers is how to make multiple, customizable EOAT devices in a short timeframe.

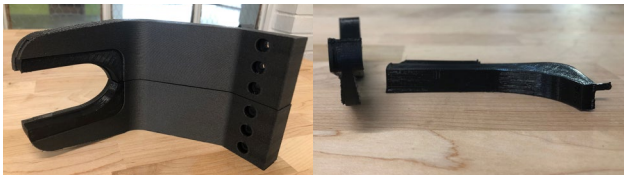
BDI Additive is a division of BDI, a global company that develops and deploys custom distribution and supply chain solutions. BDI supports many leading robotic-system manufacturers. A BDI customer required a range of EOAT devices that could be interchanged to manipulate a mix of complex and delicate items.

Solution

To tackle the problem, BDI partnered with JuggerBot 3D, a manufacturer of industrial-grade 3D printers. Together, they produced parts using DSM fused filament fabrication materials. Arnitel® ID2045 was used for the flexible, soft part of the EOAT to prevent surface scratching and Novamid® ID1030 CF10 for strength in the rigid section.

The use of 3D CAD software enabled BDI and JuggerBot to make design changes quickly, as well as ensure details were accurate. In this case, the EOAT was designed in two pieces, a dovetail joint was added to accommodate ease-of-assembly and a pin was included to ensure a proper fit between the rigid and flexible pieces. Additive manufacturing was the ideal solution for this customer and others that require multiple changes and product types.

After CAD analysis and testing to determine the most efficient production process, the first EOAT parts were produced on a JuggerBot ME12c material extrusion printer. The build took around eight hours for the rigid arm and 45 minutes for the flexible attachment. The parts have been supplied to the customer for testing.



Benefits

BDI and JuggerBot found that, in this case, 3D printing with DSM materials cost 80 percent less and was 50 percent faster compared to a traditional aluminum tooling process.

Dan Fernback, co-founder/Vice President of JuggerBot 3D says, "Typically, there are two approaches to end-of-arm tooling: pre-engineered and custom. The latter is mass produced and is designed to fit several products but may not always be a good fit for manufacturers' specific needs. Customized EOAT, on the other hand, can be designed for a specific purpose and gives manufacturers better functionality during production."

Through additive manufacturing, it is possible to achieve fine, complex design details that other processes cannot reproduce. Since 3D printing removes the need for dedicated tooling and designs can quickly be modified, EOAT parts can be produced faster. Additive manufacturing reduces production time leading to shorter lead times, as well as significantly reduces overall cost of production.

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