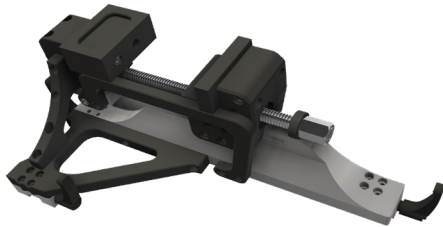


APPLICATION SPOTLIGHT

Tools and Fixtures



3D Printed Vise and Soft Jaws

Lean Machine is a metal fabrication job shop in Saskatoon, Saskatchewan, specializing in custom machining with a 5-axis CNC mill. A job for a customer required Kurt vises to hold a component while the mill cut the part. To avoid collision between the mill head and the vise, the stock would have to be clamped 12-14 inches from the cutting area. This was not an acceptable option, as a cantilevered part takes longer to machine and results in a less accurate cut. The team considered building their own metal custom vise, however they could not justify the \$6,000 price tag.

The addition of a Markforged Mark Two led Lean Machine R&D Engineer Josh Grasby to use 3D printed components to build a cost-effective, custom vise/soft jaw combination. Comprised of over two dozen 3D printed continuous carbon fiber reinforced components combined with off-the-shelf parts, Lean Machine's custom printed vise can clamp 1.5 inches from the end of the extrusion, as opposed to 12-14 inches. The company has since taken on more complex jobs, all while applying a design for additive manufacturing approach to solving other problems they come across.

	Time	Cost
Traditional	3 weeks	\$6,000
Markforged	1 week	\$1,500
Savings	66%	75%



Lean Machine CNC is a metal fabrication shop in Saskatoon, Canada, working primarily for the commercial transportation and mining sector.

Challenge

Engineers needed to mill cantilevered workpieces, which meant that they had to control media removal.

Solution

The team used its Mark Two to create a low-profile custom vise and soft jaw combination.

Results

Complex workpieces, such as the cantilevered steel, can be accurately mill without wasting any material.

+ Non-Marring Material

Continuous carbon fiber holds up against cutting fluids and abrasive environments, making it the perfect material for machine shops.

+ Accurate Parts

Markforged's cloud-connected software ensures your parts are printed accurately, leaving no room for guesswork.

+ Speedy Process

Markforged 3D printers provide users with parts in a fraction of the time it takes for traditional processes.