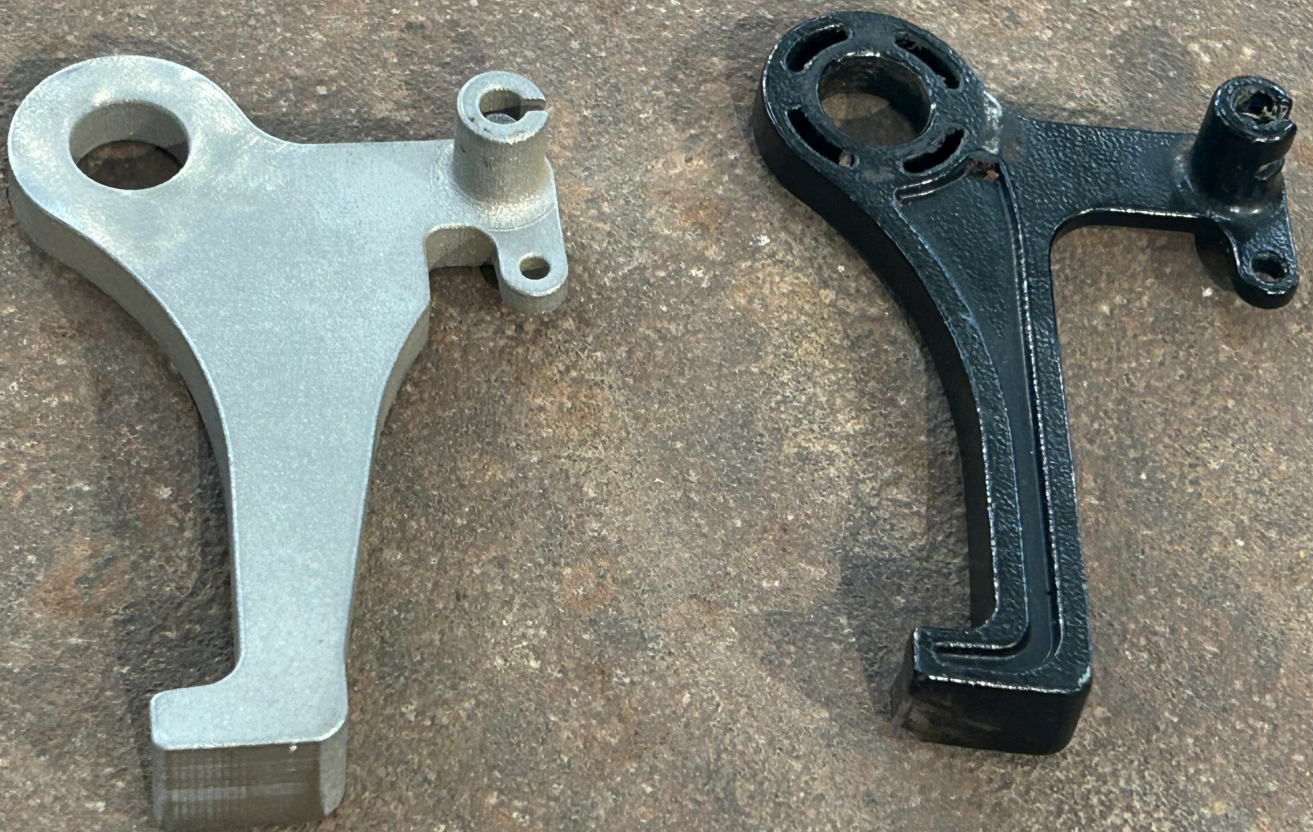


# Moving Earth with Binder Jet Metal 3D Printing

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C.J. Moyna & Sons earthmoving experts use the Shop System to decrease supply chain risks and bring better products to market faster





One of the biggest challenges in the dirt-moving business is finding equipment that can handle tough job sites. Mobile Track Solutions, sister company to C.J. Moyna & Sons, provides products fine-tuned for ease of use and maximum efficiency. Today, the company uses 3D printing technologies like metal binder jetting to further advance products.

**Customer**

C.J. Moyna &amp; Sons

**Location**

Elkader, Iowa

**Industry**Earthmoving and  
equipment manufacturing**Applications**Optimized seat latch replacement  
part, restoration components**Machine**

Desktop Metal Shop System™

**Materials**

17-4 PH stainless steel

**Website**[www.cjmoyna.com](http://www.cjmoyna.com)

## From a single bulldozer to vertical integration with 3D printing

Nearly 80 years ago in eastern Iowa, a family of earthmovers founded an earthmoving company with a single bulldozer. Today, C.J. Moyna & Sons is still a family-owned business and one of the premier heavy-earthmoving contractors in the Midwest, having expanded to add demolition; aggregate materials production and delivery; utilities installation; equipment development, manufacturing, and delivery; and advanced technology to its offerings.

John Patrick Moyna, current Owner and Grandson of founder Cecil Moyna, has used his lifelong experience in earthmoving to earn U.S. patents for equipment helping to change the earthmoving industry. From AI to 3D printing, the company today has a strong focus on technology and is embracing advanced processes to help it make more intelligent decisions and work more efficiently.

As a small company operating on a large scale, the team at C.J. Moyna has to work efficiently. Looking to increase vertical integration, the team was investigating additive manufacturing technologies when the COVID pandemic hit. “We had such a hard time finding pieces and parts,” said Ryan Young, Technology Coordinator at C.J. Moyna. “There was a lot of little 20 or 80 cent parts that we could not find. Then we kind of looked through them and realized, ‘Hey, we can just 3D print this.’”

The company researched processes focused on three use-cases within its family of companies – rapid prototyping in R&D, product

improvement, and antique restorations. “The earthmoving business has never looked so promising and exciting,” said John P Moyna. “The future of earthmoving belongs to the contractors and manufacturers who embrace the changes that are coming soon.”

In 2023, the company made a strategic investment in additive manufacturing, adopting a variety of 3D printing technologies including large-format, reinforced filament, digital light processing, and metal binder jetting. The Desktop Metal Shop System was installed to 3D print 17-4 PH stainless steel parts in-house. “Metal additive was just that next step if we want to actually make end-use production parts that could be used in a heavy construction setting,” Young stated.

From reducing development timelines to restoring antique equipment, the investment is already paying off as the company uses the flexibility of digital technologies like binder jet 3D printing to change the way it approaches manufacturing.

In fact, C.J. Moyna sees additive as so important to the outlook of the earthmoving industry that it plans to continue to grow its 3D printing expertise into a new additive-focused business that supports the Moyna family of companies into the future.

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Ryan Young, Technology Coordinator, C.J. Moyna



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A replacement latch for an industrial tractor seat 3D printed in stainless steel on the Shop System, upper left. Using a traditional process like machining to produce the design would be more cost and design restrictive. “3D printing definitely brings an advantage to making the latch in that functional design,” said Young.



The engineering team was challenged to think differently about part development and revisions once the company invested in additive manufacturing technologies like binder jetting for metal 3D printing.

## Regular production schedule using easy-adopt workflow

With a wave of new technologies to adopt, Young explained how the ease of operating the Shop System was key to choosing the Desktop Metal platform for his small team. “We looked at probably six different manufacturers and the Shop System just looked like it worked well, and we don’t have any regrets.”

The Shop System features a software-guided workflow that leads users from file prep at the workstation through build setup on the printer’s touchscreen. Since nearly all setup and operation tasks have video examples, the team was able to quickly implement the metal 3D printing workflow. “The system itself has on-screen help pretty much any time we’re doing a maintenance task or setting up for a print. It’s very convenient that it walks you through those steps and has been wonderful for myself and the other operator running the machine.”

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Working in tandem with its other additive technologies, Young explains how plastic parts are 3D printed with digital light processing (DLP) technology to ensure fitment before the Shop System builds a metal component. “We’ve challenged our engineers to think a little bit differently and outside the box for prototyping part revision.”

From exhaust manifold components to flanges and brackets, the C.J. Moyna team has risen to the challenge, finding ways to improve products with the benefits of additive manufacturing.



All printer tasks and maintenance actions on the Shop System have step-by-step instructions displayed on the integrated touchscreen.

Even for applications in need of precision-machined tolerances, Young explains how 3D printing has optimized that traditional production workflow: Since 3D printed 17-4 PH can be machined “like any other metal part,” the company is able to decrease lead times and costs by creating near-net shapes with the Shop System that are then finish-machined.

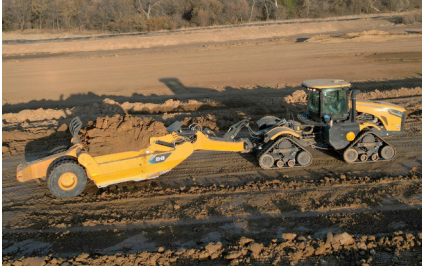
Young explained, “We can build a part and our machinists can take it down and make that tolerance exactly what it needs to be, but we’re shaving anywhere from 10-14 days off the time compared to if we would have originally machined the entire part.”

Just one year after installation, C.J. Moyna runs a regular weekly 3D printing schedule of two stainless steel print boxes on the Shop System and one combined sintering run in the Desktop Metal Furnace.

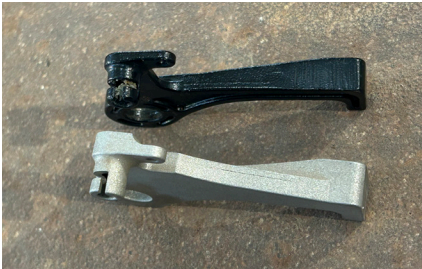


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The Shop System is used to 3D print stainless steel prototypes in-house at C.J. Moyna, enabling rapid iterations and product improvement, as well as antique restorations.

## Seat Latch Replacement



Mobile Track Solutions (MTS), part of the Moyna family of companies, was founded in 2009 to develop quality construction-grade equipment. Its products benefit from decades of experience the company has on large projects. Solutions are built to withstand the use and abuse of earthmoving while tailored to improving the efficiency and longevity of equipment.



MTS 3630 Series tractors are assembled with an industry standard seat. However, due to the extremes of the construction world, it required a latch design for that seat that exceeded the factory option available from the supplier. Customers were experiencing stress cracks as well as poor tooth engagement, and with the in-house 3D printing capabilities, the team was quickly able to take its idea for an improved design from concept to market.



Using its plastic 3D printer to make fast iterations to test for fitment, the team quickly identified a viable design. “We made probably six or seven revisions in a day,” Young explained, saying the team locked in that design before moving to metal binder jetting on the Shop System. “We had two revisions in the stainless steel, but reigned in what would have probably been six or eight months of work in traditional R&D to within a week or so.”

The stock cast iron latch has been replaced by the 3D printed design optimized in-house by the C.J. Moyna team and produced in stainless steel for end-use on the Shop System.

Young emphasized how bringing 3D printing in-house enabled them to offer a rapid response to a pain point in the market. “We can still make it cheaper than sourcing the stock replacement part, but we’re giving our customers a better part,” Young said. “This allows us to keep our customers happy by resolving an ongoing issue with a better product that will last.”



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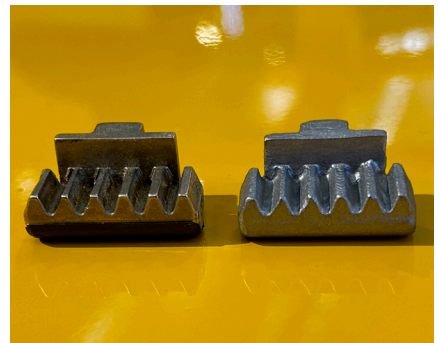
A replacement latch for an industrial tractor seat 3D printed in stainless steel on the Shop System, grey. Using a traditional process like machining to produce the design would be more cost and design restrictive. “3D printing definitely brings an advantage to making the latch in that functional design,” said Young.

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## Fan Gear

An ongoing improvement being looked at by C.J. Moyna is a tractor fan system with brass gears. The team recognized the brass components began to wear out too soon. Using its in-house 3D printing technologies to rapidly iterate and optimize designs, the team was able to deliver a stainless steel replacement with better fitment. The gears, 3D printed on the Shop System in 17-4 PH, have lasted longer in service than original brass gears.



## Restoration Equipment

To showcase the rich history of earthmoving, C.J. Moyna opened a 38,000 square foot facility built so future generations can experience the power that shaped the world. The Earthmoving Legacy Center exhibits a unique collection of equipment while sharing the stories behind the displays.

Yet restoring antique equipment presents its own unique challenges, especially in sourcing replacement parts. So the company is using 3D printing to help in its mission of preserving history for the future. “If we have an antique part that’s tough or impossible to find, we’ll go the 3D printing route to recreate it,” Young said. One restoration already features eight different parts that have been 3D scanned and 3D printed in stainless steel on the Desktop Metal Shop System.





#### About C.J. Moyna & Sons

Family-owned since 1947, C.J. Moyna & Sons is built on tradition and poised for tomorrow. The third-generation family-run company is today a collection of businesses specializing in fields including earthmoving, road construction, aggregate processing, and equipment manufacturing. The company has grown from a small shop on Hwy 13 with just two employees to over 475 employees and has expanded to work on jobs across the state of Iowa and throughout the United States. With a strong focus on technology, C.J. Moyna has embraced advanced processes to continue changing the earthmoving industry.



#### About Desktop Metal Inc.

Desktop Metal (NYSE:DM) is driving Additive Manufacturing 2.0, a new era of on-demand, digital mass production of industrial, medical, and consumer products. Our innovative 3D printers, materials, and software deliver the speed, cost, and part quality required for this transformation. We're the original inventors and world leaders of the 3D printing methods we believe will empower this shift, binder jetting and digital light processing. Today, our systems print metal, polymer, sand and other ceramics, as well as foam and recycled wood. Manufacturers use our technology worldwide to save time and money, reduce waste, increase flexibility, and produce designs that solve the world's toughest problems and enable once-impossible innovations. Learn more about Desktop Metal and our #TeamDM brands at [www.desktopmetal.com](http://www.desktopmetal.com)