





THE NEW CAPABILITIES of Additive Manufacturing

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It's easy to say, "We're going to change the world." It is far rarer to truly believe it. Extrude Hone is embracing radical new technologies to bring to manufacturing unprecedented levels of scale, complexity and precision.

Founded in the 1960s by visionary engineer Larry Rhoades in Irwin, Pennsylvania, Extrude Hone has developed and implemented innovative techniques and processes to shape a variety of industrial parts and materials for the aerospace, automotive, energy and medical industries.

The company has expanded through its innovative use of these techniques, which include abrasive flow machining (AFM). Using chemically inactive substances to grind rather than shear away metal, AFM provides high-quality results in polishing, surface stress relief, deburring, radiusing and geometry optimization.

A similar process, AFM MICROFLOW, uses smaller and much more precise amounts of abrasive particles to promote remote, real-time observation of the honing process. This precision enables Extrude Hone to employ the process with unprecedented precision and reliability, ensuring consistent quality results. The result of decades of research, MICROFLOW may sacrifice the larger scale of AFM but offers greater quality ideal for the finely machined parts required in Extrude Hone's client industries.

Other processes among Extrude Hone's considerable portfolio include thermal deburring, or TEM, which combusts pressurized methane gas to remove flashings, burrs or otherwise hidden contaminants from machine components. Electrochemical machining (ECM) uses an electrolyte fluid under a DC electrical current to spark an anodic reaction to remove surface impurities. Extrude Hone also offers variants of ECM for increased precision or flexibility, with a rewarding increase of the most important metric, client satisfaction.



New technologies

These varied processes have enabled Extrude Hone to grow from its beginnings in Pennsylvania to a company with manufacturing depots around the world and nearly 400 employees. Rhoades was to sell the successful company to Pennsylvania toolmaker Kennametal in 2005. Ten years later, Chicago-based Madison Industries purchased Extrude Hone. Joining the roster of companies under Madison's umbrella, Extrude Hone is among peers in the medical, safety, filtration and industry sectors. Extrude Hone's purchase by Madison ensures the company will enjoy an enhanced source of clients for its services.

Extrude Hone is embarking on a daring new trend: embracing additive manufacturing, in the form of the industrial application of 3D metal printing. "Through our focus on additive manufacturing, we've developed really different ways of doing things with the technology we already have established," explains Tommaso Beccuti, Business Unit Manager Extrude Hone Additive.

While Extrude Hone's traditional processes involve using various chemical methods to shape components into a variety of shapes, additive manufacturing works from a reverse perspective – forming custom-made parts at the molecular level. Utilizing this process, Extrude Hone can fabricate components more precisely than ever before, opening the door to unprecedented levels of manufacturing scale, complexity and precision.

Extrude Hone has already seen success in additive manufacturing. Several of its contract shops recently finished some of the first jet engine parts made entirely with this new process. This only enhances Extrude Hone's current achievements in the sector, usually improving fluid flow. ▶▶



► Pushing the envelope

With the advancing sophistication of aircraft systems and the advent of private spaceflight, additive manufacturing is ideal for fabricating the highly sophisticated parts required for aerospace. Extrude Hone is poised to take advantage of this burgeoning sector. “As additive manufacturing continues to grow in aerospace, I think it’s only natural that we continue to grow there as well,” Beccuti says.

Additive manufacturing is also aiding Extrude Hone’s further expansion into medical technology. The company is currently involved in such sophisticated medical technology as prosthetics, diagnostic instruments, and implant devices such as pacemakers. And just as in aerospace, additive manufacturing is allowing Extrude Hone to design and manufacture pioneering new medical equipment with unparalleled precision.

The company is now looking into FDA-approved medical devices, to be processed and finished at its Irwin headquarters. Synergistically, the combination of the aerospace and medical sector breakthroughs gives an extra impetus to expand the limits of additive manufacturing. “We feel both of those markets are developing well,” Jonathan Slade, Business Development Manager Medical, reports, “which is really giving us the confidence that we can go into new areas and be successful and conquer new spaces.”

In addition, Extrude Hone is examining its role in automotive manufacturing. While the company had previously scaled down its infrastructure in this sector, the growth of hybrid and electric vehicles is a development Extrude Hone cannot afford to ignore. “We’ve seen movement occurring in the hybrid field... we’ve already seen new applications related to this mild hybrid,” Luke Moran, Business development Manager Transportation, says.

Continuing vigilance

In the meantime, the company remains vigilantly watchful: “While we do want to maintain the hold we have, we are sort of focusing on other markets.”

As Extrude Hone explores and expands the new field of additive manufacturing, the company remains committed to its existing processes. Extrude Hone has greatly advanced the technique of AFM, though Richard Miller, Product Manager AFM & TEM, says the company still hopes to make the method more reliable. While certainly effective, this process has several variables which are not always easy to predict.

In its R&D department, Extrude Hone hopes to fine-tune AFM to better determine exactly how much material must be removed and how long it will take. Further research will also enable the company to predict maintenance needs, a boon to clients.

Another recent development is Extrude Hone’s introduction of modularity into its Eco Plus and electrochemical machining equipment. By making processes more uniform with fewer parts required, the company reduces its footprint while simultaneously reducing operating costs, as Robert Binder, Product Manager ECM, puts it: “It’s a smaller footprint design to a very efficient machine.” These machines are now for sale and Extrude Hone is accepting quotes.





Building on its success

Revisiting and refining its existing processes, Bruno Boutantin, Marketing Director, says, gives Extrude Hone the opportunity to go back to its roots. Despite Extrude Hone's international presence and leading technology, he believes the company can do more. "People say, 'the sky's the limit' – well, what does that mean? For us, it's seeing what else we can do." Extrude Hone is currently investigating more environmentally-friendly processes – cleaner solutions which use less oil and energy. Finally, the company is working on its internal practices to improve lead times and reduce costs.

The upshot of all these advanced processes is a wealth of options for Extrude Hone's customers. "We want to give the best to our customers," Boutantin says, "and we want them to have what they're paying for – no more, no less." He says the goal is to respond more quickly to customer needs, thereby improving lead times and having numerous turnkey solutions "on the shelf" when needed. "We're trying to put our customers in the middle, and have them be the center of our universe."

Yet even though a highly successful international company, Extrude Hone struggles occasionally to find qualified employees. It is also affected by global tariffs, which have spiked in recent years. To meet these challenges, Boutantin says, "We're really just trying to be more flexible. We're trying to share knowledge across different platforms," launching new cross-training programs between engineering and sales personnel. Extrude Hone is also working to leverage its company cultures in its international branches to accommodate international business. "We're trying to become stronger globally, and the way to do that is through flexibility."

The people angle

The company is branching out to recruit up-and-coming talent. Extrude Hone's biggest tool, in terms of recruitment, is being able to work with universities, and engineering departments in these universities, on special projects.

By showcasing the company's name and intentions, Extrude Hone has been able to recruit "engineers who are interested in what Extrude Hone does." This proven method, in fact, is how most team members came to work at Extrude Hone; Extrude Honers are enamored with Extrude Hone's technology and goals. "It naturally attracted us to the company." Miller and Binder both agree.

Looking forward, Boutantin firmly believes in Extrude Hone's mission to "Shape Your Future." By embracing additive manufacturing and incorporating it into its already robust array of manufacturing processes, Extrude Hone is poised to be in the forefront of 21st century industrial manufacturing.

"The company recently manufactured one of the first jet engine parts made entirely with this new process."

Also, internationally, the company is working to expand its presence in additional countries, growing new manufacturing sectors in developing areas. Together with this, Extrude Hone is fortunate to have a robust aftermarket sector to rely on as a complement to its main manufacturing business, able to maintain but also refurbish and resell older equipment. Further, Extrude Hone utilizes its global contract market for clients for whom "capital isn't really in the cards right now or simply a winning strategy." Extrude Hone teams up with various partners to offer semi-finished products, from raw material to post processed components, assuming Extrude Hone processes are at the core of the application.

Visionary ambition

With the addition of additive manufacturing, the company is poised to forge a new path in industrial output. Boutantin believes this move reflects Extrude Hone's desire to innovate, which goes back to its founder. "Larry Rhoades was such a visionary, and we're trying to get back to that spirit." ■



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