XEBEC®

DEBURRING TECHNOLOGIES

Solving Modern Manufacturing Challenges

How To Turn the Latest Highs and Lows in Your Favor

deburringtechnologies.com

Some of the most consequential challenges manufacturers face today are those they've been wrestling with for decades, such as improving efficiency, running lean and finding qualified labor. These are core challenges that play out on the shop floor – and for many, they've multiplied.

Manufacturers are more actively seeking automated and advanced tools and technology to solve for these concerns – even if it's just one tool or process at a time.

The tools offered by Xebec Deburring Technologies can have an outsized impact on production and efficiency for manufacturers. They're proven to streamline the deburring and finishing processes, reduce labor costs, save manufacturers money, and open the door for new production opportunities.

In addition, reliable precision, consistency and quality improve, and you'll make progress toward leaner, more efficient processes that allow you to get better production value out of your staff.

In this guide, we'll cover the real and present issues and opportunities manufacturers have today – and how one small significant step, automating deburring and finishing with Xebec products, can help **remedy some of manufacturers' most significant challenges** and empower them to excel.

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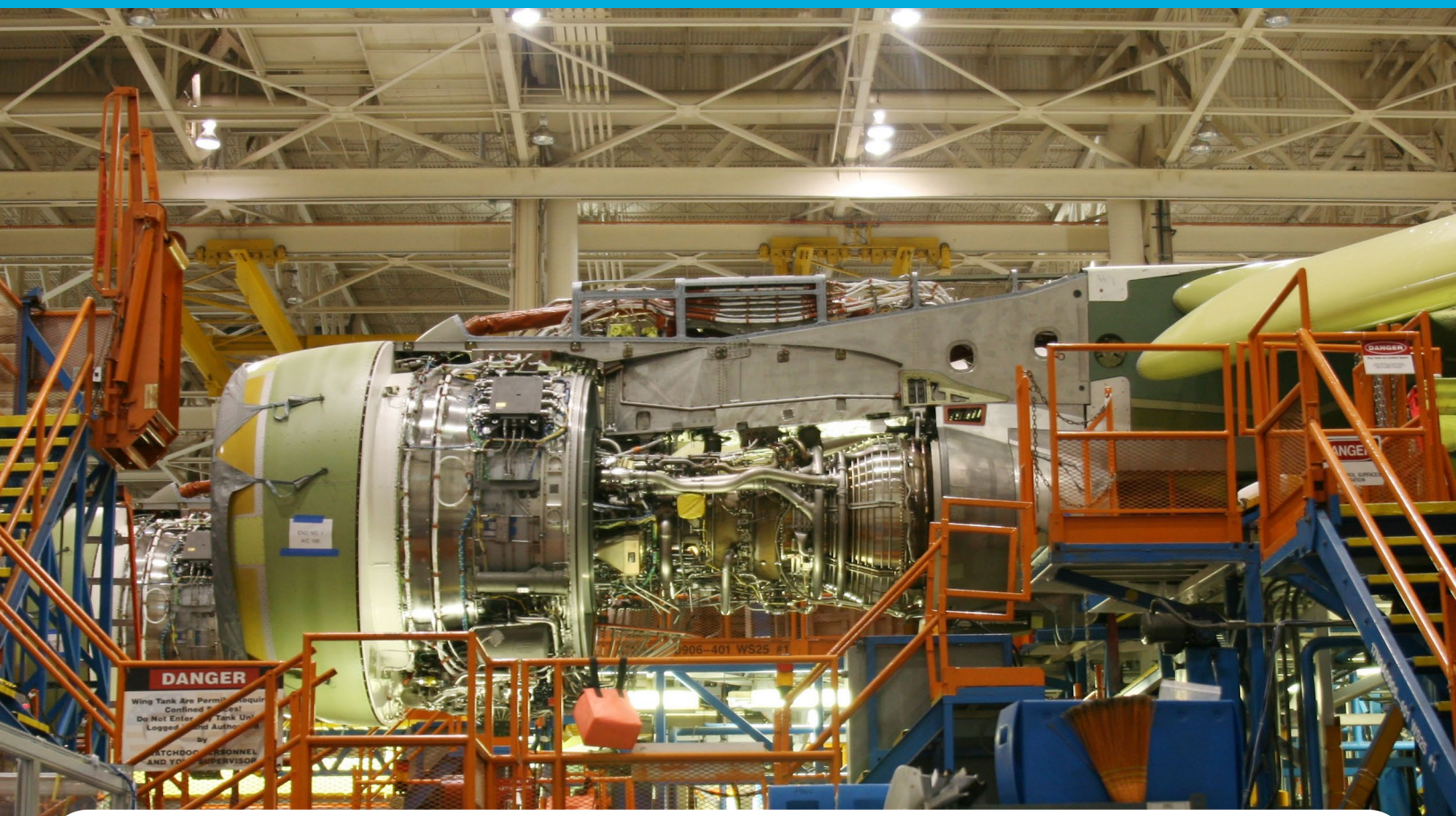


What are manufacturers up against?

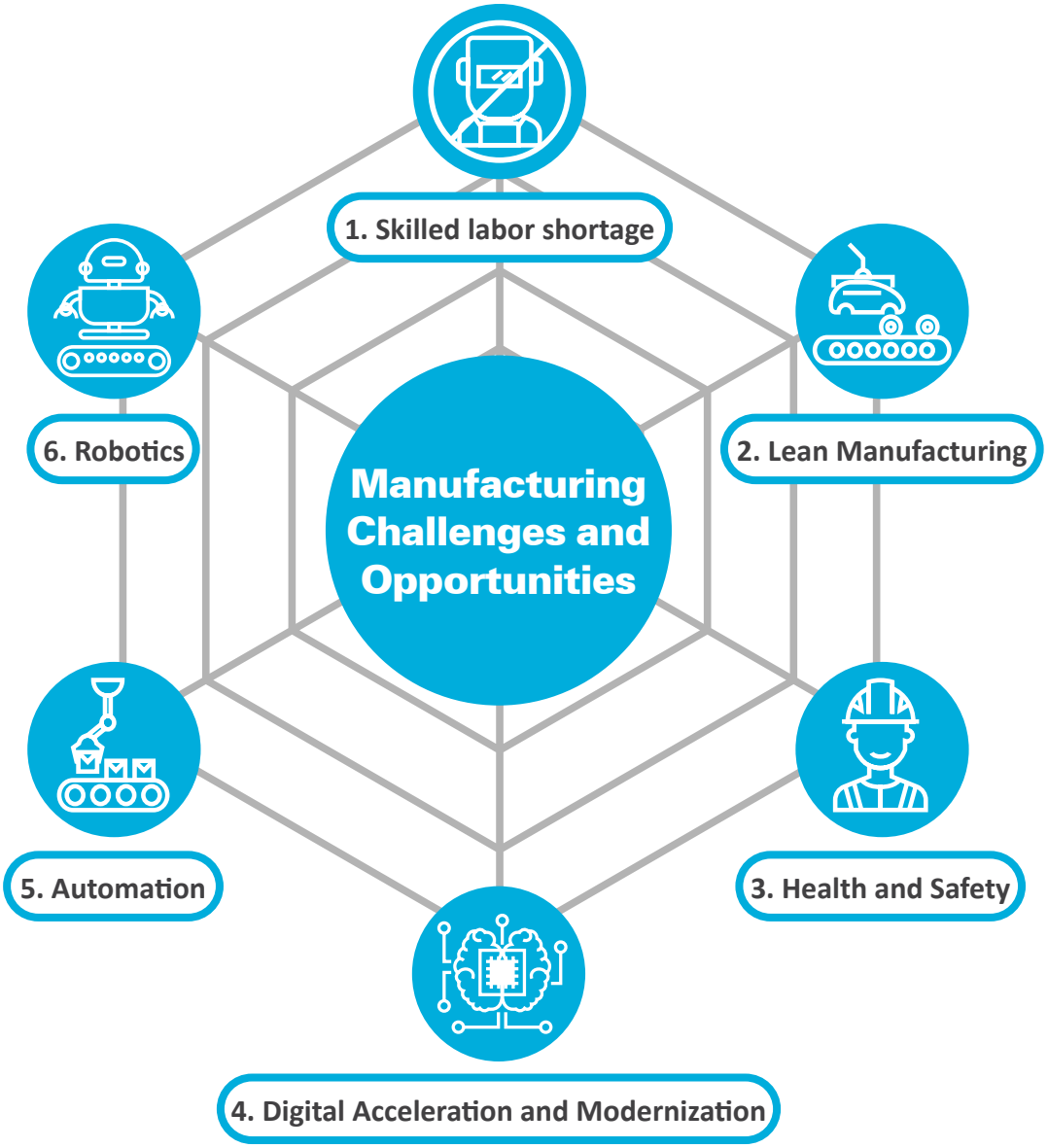
In today's market, manufacturers face common challenges – several of which have been exacerbated by the COVID-19 pandemic:

- **Customer expectations have gone sky-high.** Customers expect greater product quality and faster delivery from manufacturers, especially in industries that require tight dimensional tolerances, precise edge breaks and consistent, reliable work. Any investment manufacturers make should help them achieve both faster speeds and higher quality.
- **The skilled labor shortage persists – and even worsens.** Staff cuts and furloughs during the pandemic further fueled the existing labor shortage. Manufacturers are struggling to refill roles – particularly since a large percentage of the skilled labor force is near retirement age. Certain roles may be better assisted and filled with automation and robots.
- **Manufacturers must be prepared for social distancing requirements to persist.** The health and safety of employees is always the highest priority. Automation and co-bots can help, performing tasks that would otherwise bring employees closer in proximity more frequently and future-proofing manufacturers against ongoing public health emergencies.
- **Production demand is more challenging to plan as the economy recovers.** Demand continues to fluctuate and is difficult to predict. Manufacturers must match this demand amid a labor shortage and higher customer expectations. Automation, co-bots and artificial intelligence are top potential investments to help them capture business as it returns.

Considering these issues, are you ready to meet demand efficiently and cost-effectively? Or are investments in order?

Each investment in your organization needs to pull its weight and show its value toward your objectives, helping you be more efficient, run leaner and maximize your workforce without skipping a beat.

Research shows manufacturers are planning to invest in automation as they recover from the pandemic and future-proof their businesses and prevent obsolescence. Automating redundant, time-intensive processes like deburring and finishing can help manufacturers move toward solving major challenges, whether they're a small prototyping shop or a large production facility.



1 - Skilled Labor Shortage

Xebec Products Help You Do More with Who You Have

A recent study by the Workforce Institute of UKG reveals that 63 percent of manufacturers surveyed are "struggling" to find qualified labor for essential roles and 23 percent are "really struggling." Skilled workers for specialized roles such as welders and machinists are difficult to find, and employee turnover can be high.

Often, there is untapped potential within manufacturers' ranks. You can provide employees opportunities to gain new skills, certifications and degrees so they can move up or change course as your company evolves structurally, technologically and otherwise.

An employee who primarily hand-deburrs, for instance, can enter into an apprenticeship or other training program to become a CNC operator, machinist, engineer or quality control specialist.

Such upskilling and reskilling tactics are gaining momentum in the industry.

According to the recent Workforce Institute at UKG study, **63 percent** of manufacturers are already working on reskilling employees and **60 percent** are cross training.

To get to upskilling, you may need to introduce technology into processes that keep employees stuck in redundant activities. Automating one time-consuming task can make a big difference, such as automating deburring and finishing.

Xebec ceramic fiber brushes automate deburring and finishing, operate like cutting tools and perform both deburring and finishing at once.

With a tool of this caliber, you optimize a time-intensive process, improve safety for your workers and free them up to perform other valuable tasks. All of this contributes to retaining the quality staff you already have, maximizing their production and creating opportunities to upskill.

Besides filling gaps as needed, upskilling has the following benefits:

- **Employee loyalty.** When you invest in your employees and take their growth seriously, they are more likely to reward you with loyalty and dedication.
- **Employee retention.** Employees leave companies for various reasons, including personal needs, lack of progress in their role, burnout and higher costs of living.
- **Technology onboarding.** Planning to upskill will help manufacturers onboard industry 4.0 technology and prepare for the next iteration.
- **Reduced overtime.** Two-thirds of manufacturers say overtime is affecting their bottom line as the labor shortage continues, according to the Workforce Institute at UKG study. With upskilling and strategic technology investments, manufacturers can even out their labor needs.

With the Xebec Brush Surface, one firearms industry customer was able to reduce manpower on a task that once required six full-time employees, whom they could then redeploy to other tasks.

Here's a look at the hierarchy of responsibilities and associated qualifications at a typical shop working with CNC machines that could incorporate automated deburring and finishing:

1. **Manual machine operator (Drill presses):** High school diploma or equivalent
2. **Machinist:** High school diploma or equivalent
3. **CNC Operators:** High school diploma with 2 years of experience
4. **CNC Programming:** 2-year degree
5. **Engineers (Manufacturing, Mechanical):** 4-year degree

2 - Lean Manufacturing

Xebec Helps You Achieve Your Lean Dreams

Lean manufacturing is a goalpost for many manufacturers today. In fabrication industries, manufacturers can use Lean principles to eliminate waste, reduce expenses, optimize processes and improve quality. With innovative solutions aimed at achieving Lean manufacturing, they can keep pace in a constantly evolving global marketplace.

James Womack and Daniel Jones, in their 1996 book *Lean Thinking*, defined Lean as "...a way to do more and more with less and less—less human effort, less equipment, less time, and less space—while coming closer and closer to providing customers exactly what they want." Implementing Lean manufacturing helps address these types of waste:

- ✓ Defects
- ✓ Over-production
- ✓ Waiting
- ✓ Non-utilized talent
- ✓ Transportation
- ✓ Inventory
- ✓ Motion
- ✓ Extra-processing

Using Xebec Deburring Technologies to automate deburring and finishing processes is one high-impact way for companies to achieve Lean principles – to do more with less, improve productivity and provide customers the results they want.

This is especially true for companies that need to manufacture precisely machined parts with tight dimensional tolerances, precise edge breaks, and high-quality consistent finishes for industries such as aerospace, energy, powertrain, medical and firearms.

With a Xebec ceramic fiber brush automated in a CNC machining process, you can be more efficient and run lean – and even achieve much-desired lights-out manufacturing. Manufacturers look to Xebec to free up capacity and get more parts off of a machine in a given time period. They also look to Xebec to get a more consistent, precise deburring process to meet tight tolerances and eliminate expensive scrap.

- Save time and increase production by deburring and finishing while the part is on the machine.
- Condense time to complete the work and reallocate your workforce elsewhere.
- Allow available resources to produce higher quality parts at a greater volume.
- Achieve consistent quality and precise edge breaks, resulting in less scrap and rework.
- Make more out of setup time by deburring and finishing at once.
- Run jobs unattended, even achieving lights-out manufacturing.

Here are a few examples of how automated deburring and finishing with Xebec products specifically addresses manufacturing waste:

- Eliminates over-production by optimizing and streamlining production processes.
- Reduces extra-processing by deburring and finishing a part in one step.
- Provides opportunity to upskill and redeploy employees from hand deburring to CNC machine operation or other revenue-generating tasks.
- Reduces operator injuries and the cost of compensation claims.
- Reduces waiting related to setup time, which could otherwise take up to 10 to 15 hours for just one side of a large part like a rocket housing.
- Reduces transportation which would otherwise be required to move a part from one process to another, an often expensive and time-consuming step, particularly when outsourced.
- Reduces defects due to its inherent consistency and reliability in deburring and surface finishing.

Check out our application guide to see how Xebec's deburring and finishing tools can help your organization run Lean.

- **https://www.deburringtechnologies.com/applicationguide.html**

3 - Health and Safety

Xebec Products Help Improve Worker Safety and Enable Social Distancing

The US Bureau of Labor Statistics states that private industry employers reported 2.8 million nonfatal workplace injuries and illnesses in 2019. Of those injuries, 3.2 cases per 100 full-time equivalent (FTE) workers occurred in machine shops and related manufacturing.

Additionally, the median number of days away from work for an injured employee was eight days, which adds up to a significant loss in revenue, without accounting for the expenses incurred in worker's compensation claims.

Yet, according to the National Safety Council, the top three leading causes of work-related injuries – overexertion and bodily reaction, slips and falls, and contact with objects or equipment – account for more than 84 percent of worker injury and are all preventable.

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Technology to improve employee safety and productivity is developing rapidly and becoming cost effective for most machine shops. With an environment prone to accidents and repetitive injuries, if machine shops take smart action to automate or improve manual processes, it will pay significant dividends in the long run. It will be especially effective in terms of reducing lost days and worker compensation claims.

Such technologies also enable manufacturers to follow social distancing guidelines when imposed.

For example, automated deburring and finishing with Xebec ceramic fiber brushes improves safety and ergonomics, prevents injury and allows for social distancing. This as opposed to manual deburring techniques, which render shop techs prone to injury.

- Operators can get carpal tunnel and other musculoskeletal disorders from constant repetitive movement and awkward positioning while deburring.
- Operators can cut themselves, get splinters or injure their eye.
- Several environmental, health and safety concerns arise from the dust and particle emissions produced by manual methods.

Using a high-tech automated deburring solution with ceramic fiber brushes is a safer option for machine shops and manufacturers. Plus, it provides a consistent and high quality deburred and polished product in one process, which typically removes the need for separate polishing and QA inspection steps. It delivers the following safety benefits:

- Prevents financial loss due to injury from using inefficient tools, using man-made tools and risking cuts from sharp edges.
- Prevents injuries due to repetitive movements and from manipulating large heavy parts to be able to deburr in specific areas.
- Increases safety with automated deburring placement in an enclosed box to eliminate the inhalation of metal dust or eye injuries and cuts due to metal threads.
- Reduces the chance of injury in moving product around the shop – from the CNC machine to the work bench, to QA and polishing.
- Reduces employees' lost work days and possible OSHA fines

4 - Digital Acceleration and Modernization

Xebec Helps You Evolve to Meet New Standards

Customer expectations are high, particularly in high-precision industries. Manufacturers are expected to keep up with digital and technological advances as the pressure mounts from their partners and clients. And potential partners and clients may pass up a manufacturer that isn't keeping up with change.

But modernizing isn't as simple as making a wish and snapping your fingers. Manufacturers have significant barriers to progress, including:

- **Making time to implement newer, better processes:** Engineers and programmers have difficulty finding time to research and implement new technologies. For instance, it may be easier to leave a hand-deburring process in place than implement a new technology because hand-deburring is a known quantity and typically not included in cycle time calculations.
- **Committing to doing the work upfront for long term gain:** With production ramped up for most companies still dealing with a labor shortage, setting aside staff's time to implement new technologies and processes is difficult. However, there's no better time to implement innovative technology that saves time and money than in these competitive times.
- **Maintaining a negative mindset:** Many company leaders and staff are hesitant to implement newer, better processes. It's easier to stay in the status quo. Overcoming objections and looking at the bigger picture is difficult but necessary to remain competitive in today's market.

Xebec helps with each of these challenges:

- ✓ **Time:** Xebec helps engineers initiate new deburring solutions for their parts. An engineer can give Xebec's knowledgeable reps a part or 3D file and tell them what they need done on it. Then Xebec will help design a process to achieve their desired result and coordinate test runs to facilitate the finished product.
- ✓ **Upfront work:** Xebec provides programming and training support to their customers to ease the workload. Xebec helps with testing, design, installation and training of operators to ensure the best possible results.
- ✓ **Mindset:** To overcome objections, our experts can pull from their experience in solving deburring challenges for manufacturers of all sizes in a wide variety of industries and partner with engineers to design a solution to increase production and quality in your organization.

5 - Automation

Xebec Helps You Automate Where the Impact is Greatest

Manufacturers are feeling tremendous pressure to automate across their operations. There's an expectation for digital transformation and automation in almost every business function, from finance to operations and supply chain management. All are essential to compete as agility becomes more imperative and expectations for speed, throughput and quality tighten.

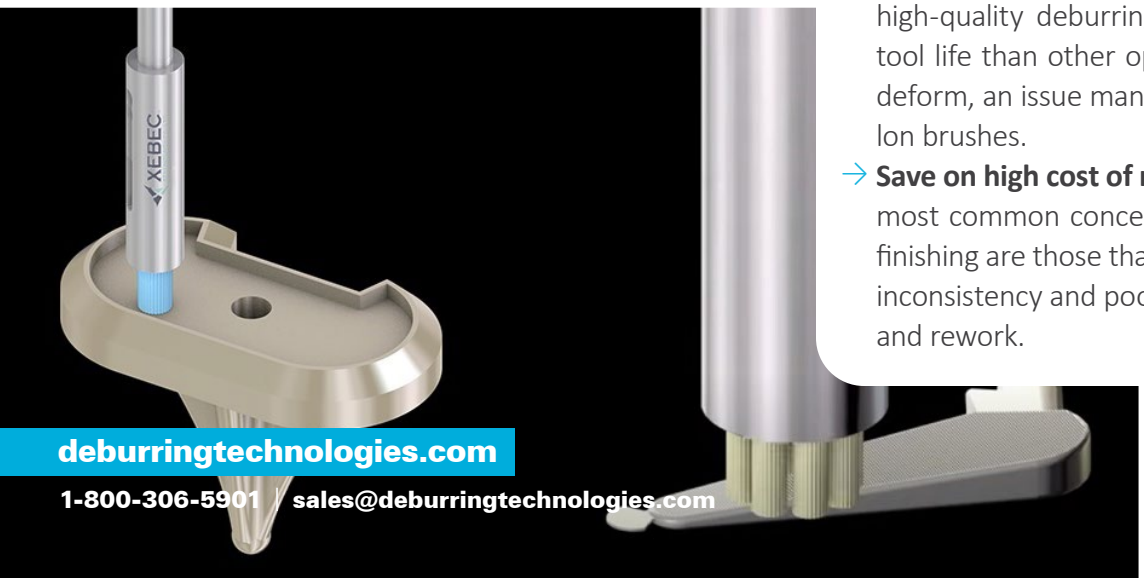
Yet all-over automation isn't achievable for most. So, it's critical to make the investments that get you the most immediate and effective returns – and solve your worst production headaches.

The benefits of automation are clear. The right solutions can help you fill labor gaps, meet customer expectations for speed and efficiency, and even retain a more supportive environment for employee health, safety, morale, stability and reliability.

For example, automating deburring and finishing can relieve pressure on your production line, modernize your processes, increase worker safety and pave the way for career opportunities at your organization. It's a relatively simple upgrade with significant ripple effects for productivity, efficiency and profits.

In other words: Automating deburring and finishing helps you automate where the return is high. The results we've seen manufacturers realize automating their manual deburring and finishing processes prove that this option belongs on your priority list. Manufacturers in a number of industries already use Xebec products, such as firearms, energy, medical, aerospace, powertrain and more, to:

- **Increase production capacity and throughput.** Xebec products deburr and finish parts faster and more efficiently than manual processes and nylon brushes. You'll be able to increase throughput on your machines, allow operators to run multiple machines at once and reallocate staff to other tasks.
- **Meet high standards for consistency and quality.** Xebec ceramic fiber performs like a cutting tool and delivers precise edge breaks and consistent, high-quality deburring and finishes. It has a longer tool life than other options in the market and won't deform, an issue manufacturers experience using nylon brushes.
- **Save on high cost of manual processes.** Some of the most common concerns with manual deburring and finishing are those that have associated costs, such as inconsistency and poor quality leading to costly scrap and rework.



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6 - Robotics

Xebec Can Help You Enter the Realm of Robotics

The market for industrial robotics is continually growing and is expected to reach $75.3 billion by 2026. Robots have already proven themselves in various manufacturing roles. Deburring and finishing are some of the latest functions to benefit.

With robots, manufacturers can automate these processes for parts and products that aren't as well-suited to deburring and finishing on a CNC machine. Additionally, robots can cost significantly less compared to CNC machines depending on their size.

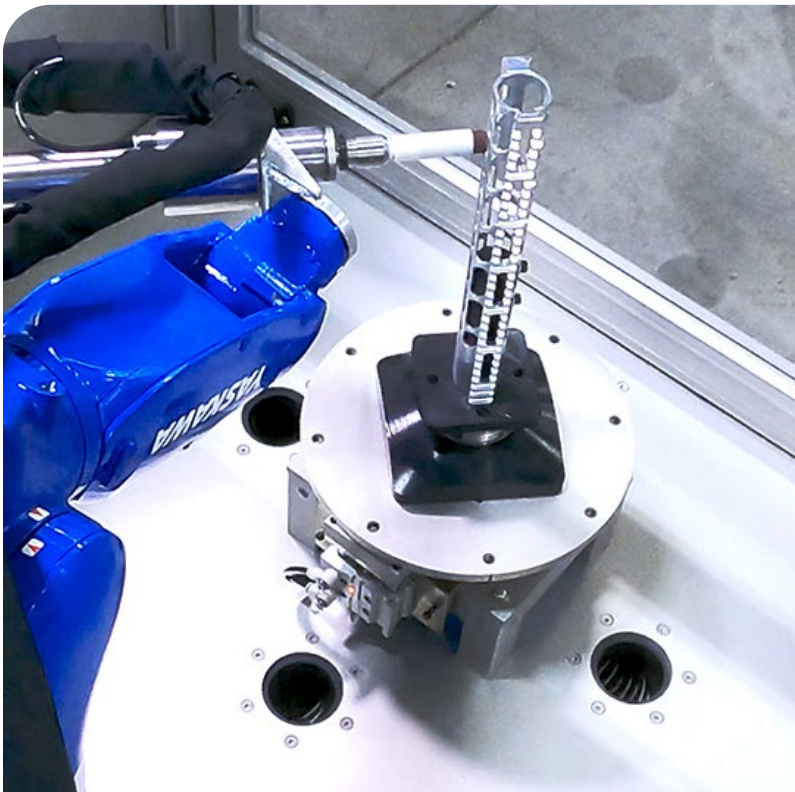
While robots cannot mill a part out of a block of metal, both CNC machines and robotics can be paired with automated deburring methods. And both tend to perform better than manual deburring methods.

Manufacturers are turning to robotics to get a plug-and-play solution that automates deburring and finishing while achieving consistency, accuracy and precision. Many even favor robots over their CNC machines for certain parts. They're realizing incredible benefits, including:

- Meeting requirements for high precision and accuracy, especially in industries that require tight tolerances.
- Achieving consistency in quality, which translates to greater reliability and less QC time.
- Improving safety in their facilities and avoiding costly damage and employee injuries.
- Reducing waste of tools and abrasives with shorter tool life.
- Freeing up skilled labor to perform other tasks, potentially offsetting the labor shortage.
- Increasing capacity and production due to consistency, reliability and speed – even while running lean.
- Saving space in the shop.
- Reducing scrap and rework.
- Potentially saving on cost of more expensive CNC machine versus robots.
- Ultimately saving money and increasing revenue due to all these improvements.

Automated deburring and finishing, whether with a CNC machine or robotic arm, can greatly improve on results and output from manual methods. Both also improve safety and help manufacturers optimize their workforces, especially when paired with Xebec ceramic fiber brushes. But the decision you make between the two can have significant implications for your operations.

You must determine the best route to automate deburring and finishing at your facility. It's best to consult with an expert, such as Xebec's deburring and finishing pros, to ensure you make the investment with the best returns to design the optimal system for your needs. At Xebec Deburring Technologies, our reps have a wealth of experience in a range of industries and manufacturing environments. We can help you identify the perfect solution for your application.



Additive Manufacturing and Xebec – an Innovative Option for Prototypes

Additive manufacturing, the process of creating an object by building it one layer at a time, can be used to easily create customized products and is ideally suited for prototyping. Manufacturers use direct metal laser sintering to join layers of metal powder together. This is advantageous for industries such as aerospace and medical that are continually redesigning and refining critical parts.

Despite which method is used to create a metal part, all need deburring or finishing once created. As you accelerate adoption of technologies like robotics, artificial intelligence (AI) and automation, you must also retire outdated manual processes that counteract the time and cost benefits of those technologies.

Additive manufacturing and Xebec products are a perfect match for innovation, ensuring consistency, quality and efficiency for post-process deburring and finishing. Xebec works with pioneering customers who are testing these methods in the aerospace and medical industries and helping them to integrate efficient finishing standards into these new processes.

Why Xebec?

A small change can make all the difference.

Deburring and finishing are just two in a long list of critical processes to target to answer today's challenges. However, automating deburring and finishing is an investment that doesn't just help solve problems with quality and production – it also creates opportunities. While improving throughput and quality, you can add machines to run more jobs with reallocated labor time, and more.

For example, **Area Tool & Manufacturing** wanted to be able to run their machines "unattended" and be as efficient as possible with the two operators and six CNC machines they have. They implemented an automated deburring process with Xebec ceramic fiber brushes in place of manual deburring for a single part. They experienced a lift in productivity, saved up to 60 hours of labor per year, and improved their quality and consistency.

Upon implementing the automated Xebec deburring and finishing process, **Area Tool & Manufacturing** was **able to run their CNC machines "unattended"** while achieving improved quality and consistency of the finished product. As an added bonus, the lift in productivity **allowed them to take on additional jobs.**

Xebec Deburring Technologies: Performs like a cutting tool.

Xebec's cutting fiber is the world's only brush made by **continuous ceramic fiber.** This unique material allows for high performance grinding power, obtaining tight tolerances, consistent performance and superior surface finish. The fibers are formed into bristles for brushes or bound into stones. Self-sharpening tips lead to superior grinding performance. End-to-end solid abrasive rod material assures consistent performance.

Unlike brass wire, steel wire and abrasive impregnated nylon brush filaments, the unique design of the Xebec fiber rod allows it to maintain its shape with no deformation even after repeated use. This leads to consistent performance time after time. Achieve a beautiful, finely finished surface without tool marks or residues.

The Xebec ceramic fiber has 3 features that enable CNC deburring & polishing:

1. Unsurpassed Grinding Power

Our uniquely developed ceramic fibers themselves are the abrasives and its fiber content ratio is over 80%. Cutting edges that are made up from the tip of each fiber bristle create overwhelming grinding power. Xebec Brush™ has 60 times higher grinding power compared with nylon brushes and steadily removes burrs.

2. Consistent Cutting Performance

Due to the structure of Xebec ceramic fiber, new cutting edges are always exposed. The brush maintains consistent cutting performance to the end, enabling CNC deburring and polishing.

3. No Deformation
Xebec Brush™ maintains its straight shape and does not spread out like a toothbrush even after repeated use. Thus, it is ideal for CNC deburring and polishing in mass production line.

The result? A precise product in a matter of seconds, with a return on investment fast enough to warrant the cost.

Xebec ceramic fiber is up to 60 times faster, achieves higher quality, has a longer tool life, and produces more consistent results than other brush options.

Xebec deburring technologies, such as the Xebec ceramic fiber surface brushes that act like cutting tools, achieve more consistent and quality finishes than other brushes – and far outperform manual deburring in terms of time and results.

Why Modernize a Manual Process that "Works?"

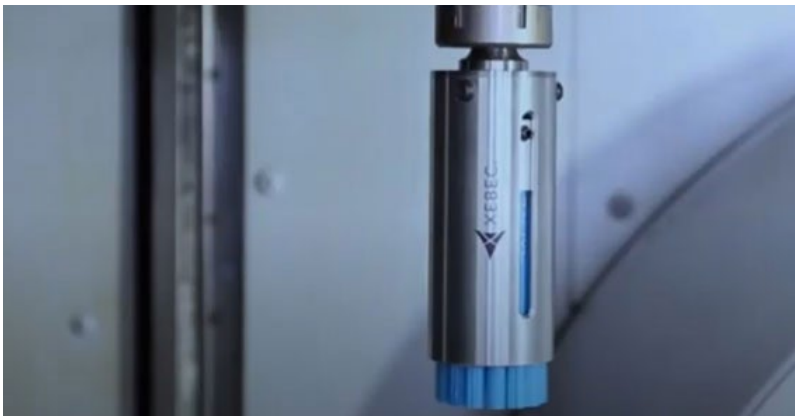
Because it's working against you.

The results of manual deburring and finishing can be inefficient and inconsistent. It takes a lot of time and pulls employees away from more productive activities. Then, if the final product isn't to spec, it might be scrapped.

It's an unfortunate, often daily nuisance that manufacturers have come to terms with. But with today's technology, they can move past this headache by automating the process.

Manual deburring comes with inherent quality issues. If you perform this type of work at your shop, you'll likely find these issues familiar:

- **Imprecise edge breaks:** It's nearly impossible to achieve a consistent or precise edge break with manual deburring, especially if the part is very thin.
- **Inconsistent deburring:** Manual deburring is often performed by various employees with various tools – for varying results. Even employees dedicated hand-deburring will produce varying results depending on the time of day and their energy level.
- **Inconsistent finishing:** For shops that provide finishing services, these same manual deburring issues can lead to inconsistent finishes.
- **More scrap and rework:** Manual deburring increases the rate of scrap and rework, which can waste time, money and resources. If a company has to scrap or rework a part, the loss includes setup time, as well as the cost of acquiring materials and/or replacing the part and performing quality control and can add up to a significant expense.
- **More quality-control work:** Deburring manually often calls for more quality-control inspections, increasing the cycle time.



Automated deburring solutions have the potential to take deburring rates from two parts per hour to 30 parts per hour, and scrap rates from thousands of dollars down to hundreds. Automated deburring and finishing can also drive a company's reputation for consistent and precise quality to a new height thereby creating happy customers and attracting new jobs.

Our Experts are Ready to Help

Are you looking to modernize your deburring and finishing processes? Reach out to discuss your challenges and learn more about the opportunities available when you automate deburring and finishing with Xebec Deburring Technologies.

Learn more about potential uses of Xebec products by industry:

Aerospace

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Firearms

Learn More >

Energy

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Production

Medical

Powertrain

Learn More >

Tell us more about your application and how we can help you automate and improve your deburring and finishing process.

CONTACT US