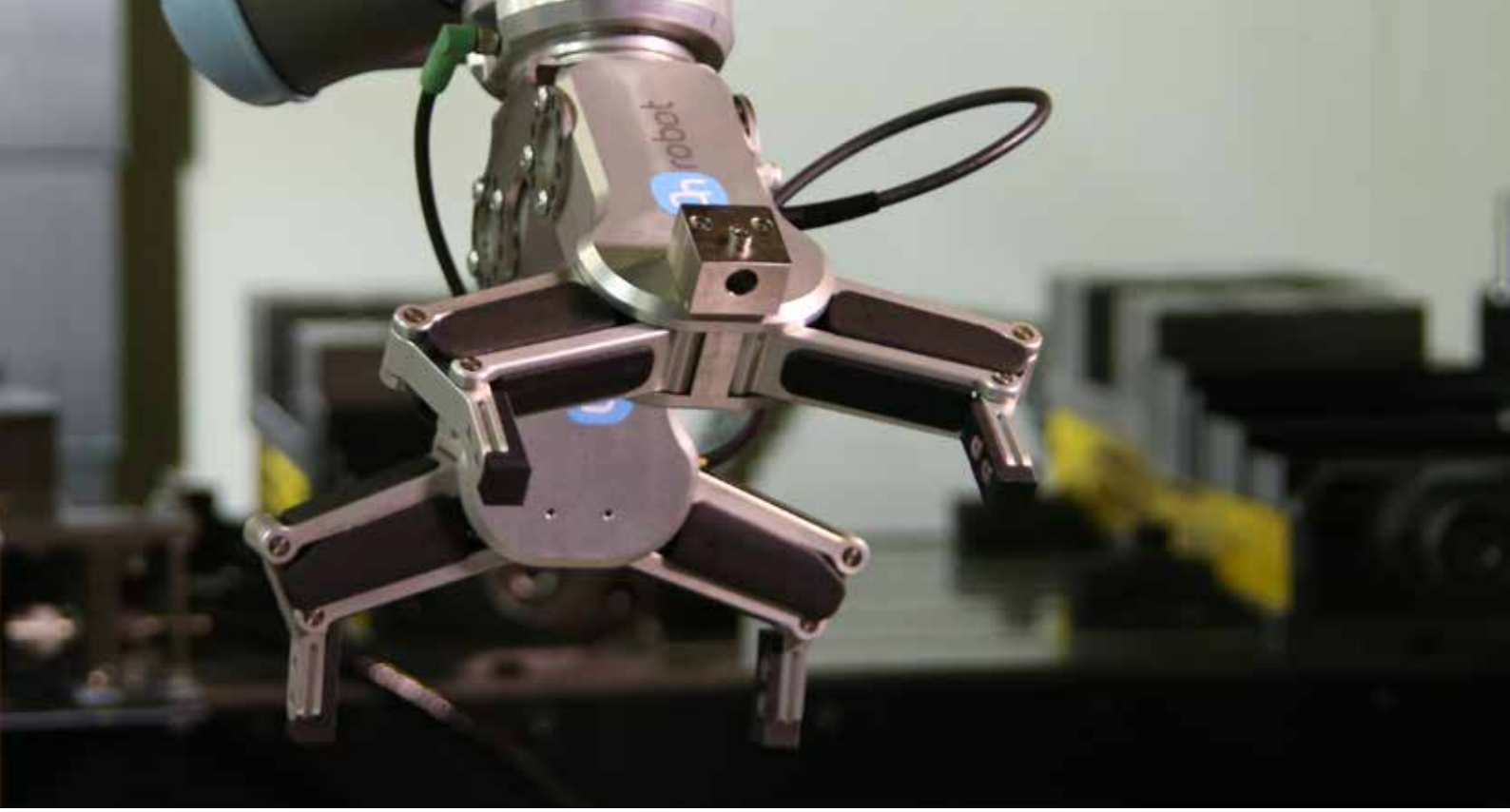
METALS AND MACHINING

EBOOK

Make Collaborative Automation Work for You

OnRobot



Collaborative automation drives success in metals and machining industry

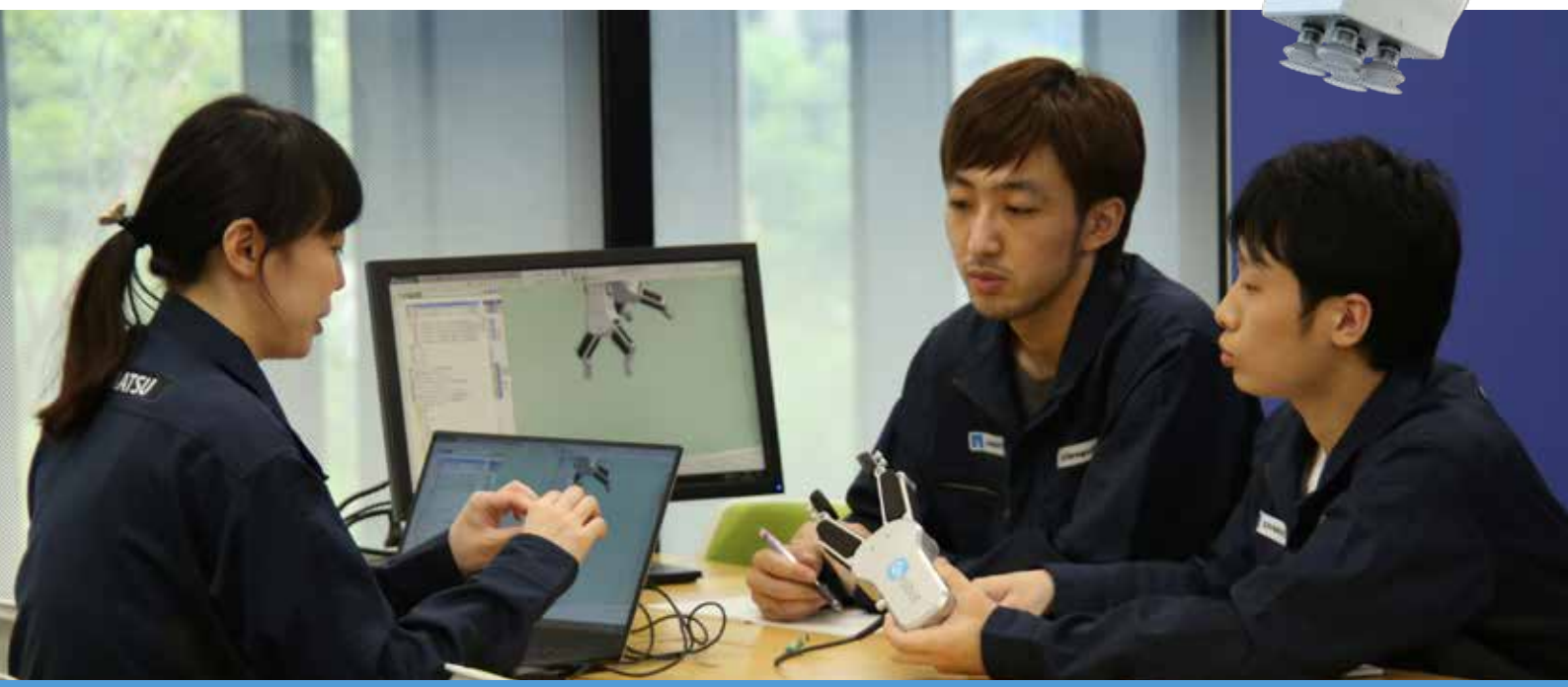
The key to machine shop success is keeping your equipment running. Unfortunately, it can be hard to find and retain workers for jobs such as machine tending, welding, and surface finishing, as well as assembly and packaging. It's not surprising, then, that so many metals and machining shops are turning to automation to keep processes running, even around the clock if needed.

Collaborative automation is changing the game, especially for small and mid-sized metals and machine shops that typically can't afford complex, inflexible, and expensive industrial robots. Collaborative automation using cobots or lightweight industrial robots offers flexibility for the high-mix, low-volume production that is common in metals and machining.

These robots are small enough to fit into almost any production floor or work cell, taking up about the same space as a human worker. They feature easy programming, even without robotic experience. And with flexible, plug-and-play peripherals, they can be quickly deployed, moved, and redeployed for multiple jobs, parts, or processes. Collaborative automation is affordable and offers fast return on investment—typically in well under a year.

How to get started with collaborative automation

Collaborative automation starts with your specific needs—your shop, your employees, your products. It's what you know best, and what every decision is based on.

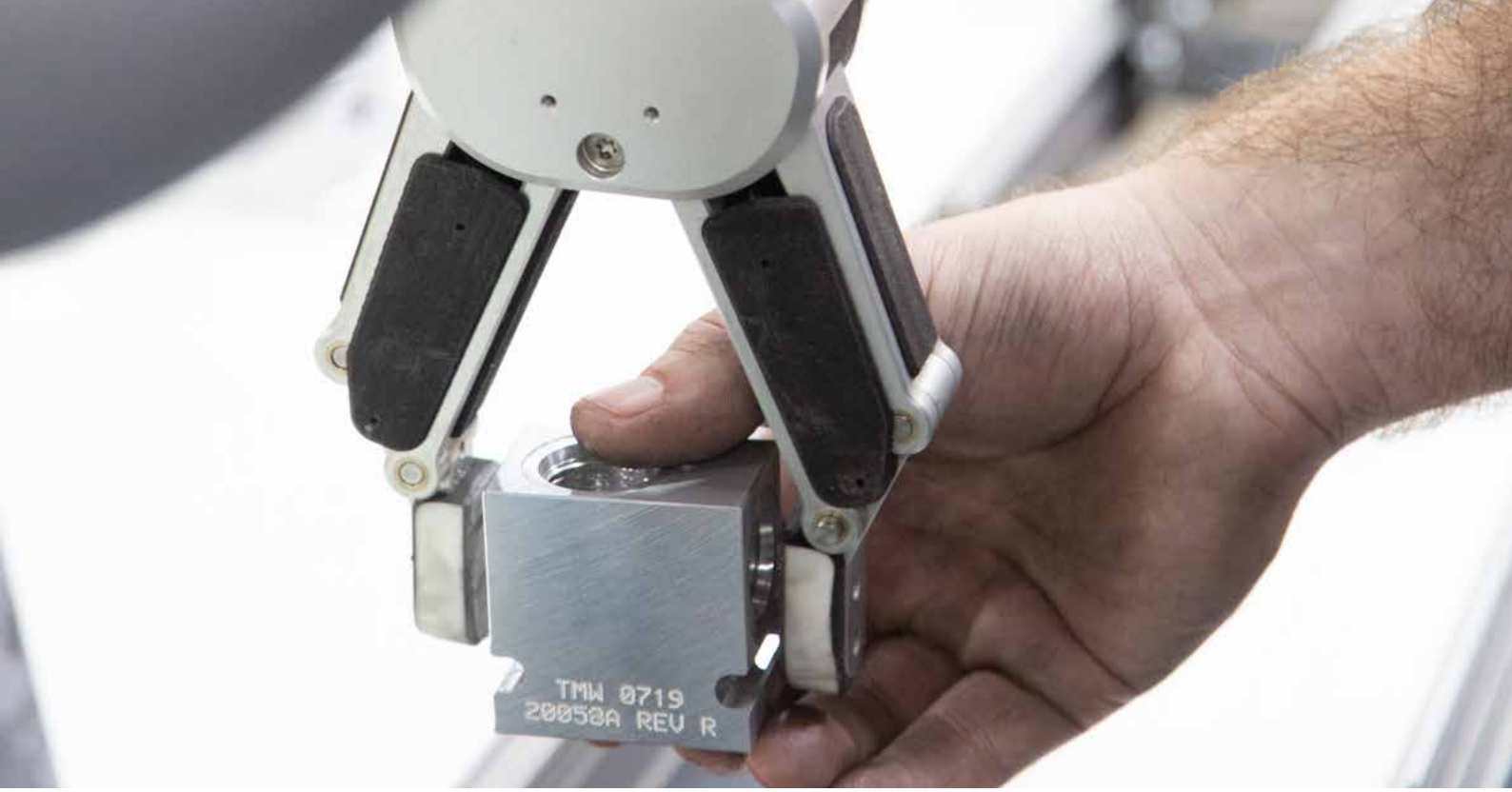


Some things to consider when deciding where to start with automation:

- The best processes to start with aren't always your highest-volume parts. Instead, look for simple processes that are hard to keep staffed because they're dull, repetitive, or dangerous.
- Consider automating jobs that are hard to fill because of a shortage of skilled workers for that task.
- Identify employees you wish you could move from low-value processes to higher-value work and see how automation can free them from those lower-value tasks.
- Take into account machines and processes with long cycle times that leave a human machine tender idle for much of their shift.
- Think about processes that could run untended or overnight so parts are ready for workers at the next shift.
- Focus on parts or processes that have high scrap rates or consistency issues.
- Explore processes that present safety or ergonomic concerns for workers.
- Evaluate processes that would allow you to scale your business if you could gain efficiencies or higher volumes.

“This was our first installation of machining center equipment, and compared to before this, automation has a big impact because it increases our unmanned fabrication hours. This has led to a 10% reduction in the machining center’s production costs… Installing collaborative robots and applications can have a big impact, especially at small and medium-sized factories pursuing advanced high-mix/low-volume production.”

Tetsuro Tanabe
President and CEO
SANMATSU



Your collaborative automation questions answered

What applications should I automate?

One of the biggest advantages of collaborative automation is the flexibility allows you to cost-effectively automate a wide range of processes and tasks. Start with low-hanging fruit: processes that are simple, repetitive, and hard to staff, such as machine tending.

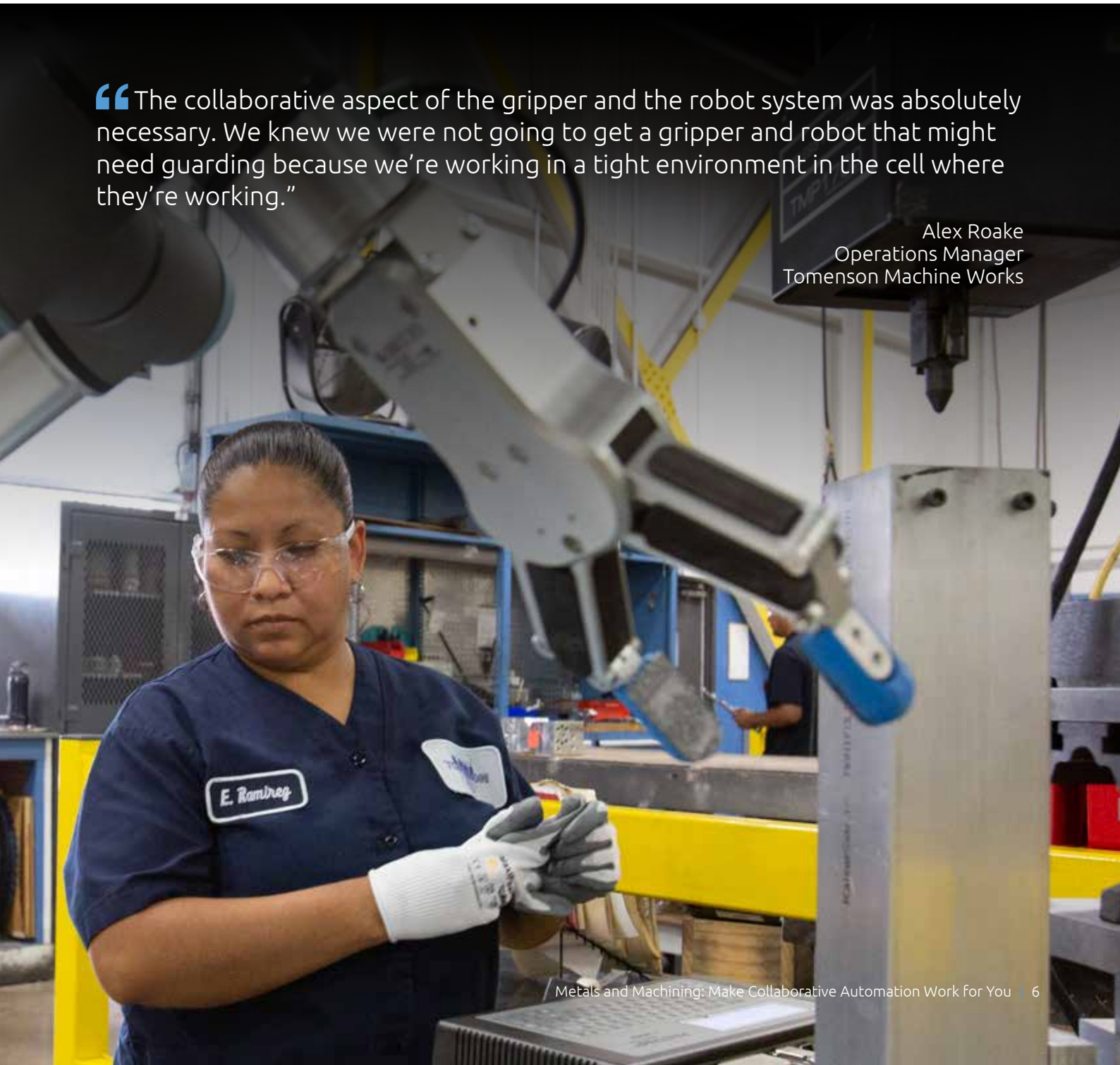
With customizable and plug-and-play peripherals, the robot can be adapted to simultaneously handle different parts with changeovers in minutes. You can inexpensively automate new processes, such as deburring, polishing, assembly, or packaging and palletizing, using the same robot arm and a different tool. You can also upgrade simple applications that use only a gripper by adding capabilities such as force sensing or vision to automate more complex processes.

> “The reason we chose pin stamping for our first application into robotics is because we saw it as the easiest and most-repetitive task on the production floor. We like the OnRobot gripper for this application because we have many different part sizes and we knew that the RG6 could handle our biggest parts and our littlest parts going into the pin stamp.”
>
> Alex Roake
> Operations Manager
> Tomenson Machine Works

How can I fit a robot on my production floor?

If your machine shop is like most, square footage is at a premium with minimal additional space. Existing equipment and work stations can't be easily moved, and processes are already set up for the most efficient layout.

The small footprint of lightweight collaborative robot arms means they take up about the same amount of space as a human worker. They can be easily mounted on an existing work station to take over repetitive jobs such as machine tending, assembly, surface finishing, or packaging without requiring any changes in your production layout. Built in safety features enables robots to be used without bulky safety guarding, even right beside human workers.



"The collaborative aspect of the gripper and the robot system was absolutely necessary. We knew we were not going to get a gripper and robot that might need guarding because we're working in a tight environment in the cell where they're working."

Alex Roake
Operations Manager
Tomenson Machine Works

Can I automate high-mix and low-volume production?

For many metal and machine shops, demand for parts can change on a regular basis—and even with little warning. You need to be able to turn on a dime to respond to customer needs without impacting the rest of your production floor. But even low-volume production can be profitable under the right circumstances.

Collaborative automation is designed for flexibility. A wide range of grippers and peripherals that can handle parts of any size, weight, or material is readily available. For example, a flexible tool allows the robot to handle components with diverse geometries and high surface finish. You can also dramatically increase machine tending production with a single robot by switching from a single to a dual gripper. This decreases cycle times and boosts CNC machine utilization by handling two objects and actions simultaneously, no matter how different they are.

These plug-and-play tools are integrated with the robot's teach pendant, so programming is fast and intuitive. Programs can even be saved to be reused later for parts and/or processes that repeat over time. This results in fast setup for immediate productivity, especially for small runs.

> “We have to be flexible with our product variety and the small quantities involved and be able to convert our production lines quickly. Collaborative applications can be flexibly converted for new tasks and are easy to program.”
>
> Jaap Zentveld
> Assistant Production Manager
> Donk Industries

How long will a robot take to be productive versus just bringing in more workers?

For many machine and metal shops, hiring, training, and retaining workers is an ongoing challenge. Shop owners who don't have robotic experience may feel more comfortable with that familiar headache rather than considering new technology. But if there's one thing business owners have learned, it's that being able to adapt and learn is the key to growth.

One of the most-cited advantages of collaborative automation is how intuitive it is to learn, set up, and get productive quickly, especially for simpler applications such as machine tending. Automation gives you the ability to grow whether or not you can bring in additional workers, even for seasonal or other demand surges. And when you do bring on new employees, you can provide more rewarding and higher-value positions that take advantage of their unique skills and keep them motivated.

> "Let's say it's a Thursday and we get a hot order. We'll get the job set up and it will be on the saw on Friday so I can have second shift run the robot just loading and unloading. By Monday, we're already shipping the parts to the customer."
>
> Geoffrey Rose
> Secondary Operations Lead
> and Quality Supervisor
> Tomenson Machine Works

> “We can now run our gripper on first and second shift, so in around six to seven months we will get our return on investment.”
>
> Alex Roake
> Operations Manager
> Tomenson Machine Works

How long does it take for a robot to pay for itself?

In competitive markets like metals and machining, any new piece of equipment has to pay for itself as quickly as possible. Whether you can do a detailed return-on-investment (ROI) analysis based on extensive past data, or have to rely on rough estimates in a changing market, collaborative automation typically offers faster ROI than many other kinds of equipment—often in less than a year.

The flexibility of collaborative automation can help accelerate ROI. Even if the initial application is short-term, the robot and flexible tools such as grippers can be easily redeployed to new processes or products without additional investment.

Another advantage of collaborative automation is its ability to extend the life of other machines, which can experience slower cycle times as they get older. While continuing to run those machines can become costly with a human worker tending them at a slower rate, a robot can tend those machines without breaks, around the clock, and even in off-shifts. That increases the machine’s effective life and extends the time needed for an additional capital outlay.

How can collaborative automation help with employee safety?

Having an employee tend machines such as press brakes presents significant dangers to the worker. It can also result in significant costs for machine shop owners who may struggle to keep up with safety standard requirements, leading to hefty fines. But even lower-risk equipment and tasks can have safety challenges, from repetitive stress injuries to dangers caused by lack of attention (especially for boring, repetitive tasks).

By automating machine tending, you can reduce dangers to employees, costs due to insurance claims, and productivity impacts of employees missing work due to injury. By automating processes such as sanding, polishing, and deburring, you eliminate operator fatigue for these repetitive tasks and improve compliance with local health and safety regulations as the workers can be removed from dusty environments. Collaborative automation is ideal for dangerous processes or handling sharp metal parts, and robots work consistently without tiring or losing concentration.

> “We used to fabricate using two machines. But because we can now operate automatically at night with robots, we can do the job with one. There used to be a lot of overtime but now we’ve cut that down and workers have it easier.”
>
> Shinichi Miyashita
> Machinery Group, Microfabrication Team Head
> SANMATSU

Get started today

Collaborative automation is easier and more affordable than you might think. Benefits include increased productivity, greater flexibility and adaptability, and higher quality and consistency.

What processes and applications could you automate?
It's easy to get started! Let the OnRobot team help yours.

BUILD YOUR ROBOTIC CNC MACHINE TENDING APPLICATION WITH OUR ONLINE TOOL >>>

About OnRobot

OnRobot is the right choice for manufacturers who want the benefits of collaborative automation to build a resilient, productive business. No matter what process you need to improve, OnRobot can help you automate swiftly and seamlessly. With all the tools you need from one partner, you can focus on your business needs and manufacturing processes. You'll save costs and increase productivity while growing your business with flexible automation tools, unified programming, and easy deployment.

One stop, one system, zero complexity.

Headquartered in Odense, Denmark, OnRobot also has offices in Dallas, Soest (Germany), Barcelona, Warsaw, Shanghai, Tokyo, Seoul, Singapore and Budapest.

For more information visit: www.onrobot.com
Or contact us: sales@onrobot.com