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HTE AUTOMATION
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Cobots help manufacturers reveal the heart of the wood

Robot Sanding

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↑ Cover:
The electric random orbital Sander with automated Grit Changer by OnRobot.

Next generation automation for cabinet and furniture manufacturing

Automation has been the glue keeping the wood industry together for decades. From the head rig saw to edging, trimming and planing, machines have helped humans turn raw lumber into finished materials for buildings, furniture, cabinetry, and a wide variety of consumer goods. But when it comes to shaping a plank of wood into the back of a chair or finish sanding cabinet doors or a headboard, automation hasn't been as common – until recently.

Today, collaborative robots (or "cobots" for short) are helping wood, furniture and cabinet manufacturers, to keep up with demand in the face of dwindling numbers of qualified shop workers, while improving product consistency and quality. Workers are benefiting too, as cobots assume sanding, machine loading and assembly tasks that contain the "3Ds," meaning the tasks are dull, dirty and dangerous, specifically causing repetitive injuries for workers during long shifts.

↑ AFK Gardens in Lincolnshire, England, has deployed two ceiling-mounted UR10e cobots to sand garden furniture. The cobots are outfitted with the Mirka® AIROS, a lightweight sanding head that integrates directly with the UR cobot arm through a "URCap"; a software handshake between sander and cobot arm that enables the user to program the sander directly from the cobot's teach pendant. To extend the reach of the UR10e cobots, AFK Gardens added the 7th axis slide kit from Ewellix, which also comes with a URCap for easy integration with the UR cobot.

The Woodworking Labor Gap

During a 2018 meeting of the Wood Products Manufacturers Association, company leaders were asked to cite their biggest challenges. Universally, they listed finding skilled workers among the top three hurdles they face. In a separate survey by Woodworking Network, 80% of 150 woodworking manufacturers said they have trouble filling open positions.

Labor shortages in the woodworking industry shouldn't be a surprise. Young workers have trended away from manufacturing in general, likely in part because of the difficult work conditions. But the challenges in the woodworking industry go beyond recruitment and changing expectations from younger workers.

For example, finish sanding can be dirty, hard, and physically demanding. Finally, in the age of COVID-19, putting more than one worker at a station is problematic. However, pairing a human worker with a cobot can improve productivity by 85%, while enabling multishift and/or "lights out/zero touch" production.

↓ Paradigm Electronics in Toronto, Canada, has implemented UR10 cobots that work in tandem with operators in a polishing application, enabling a 50% increase in production.

↑ Robotiq air-powered orbital sanding kit, with Finishing Copilot URCap software.

Cobots Make Woodworking Cool Again.

Woodworking cobots alleviate many of the concerns with automation from employers and employees.

For example, cobots can take on the most difficult sanding operations while human workers tend the robotic work cell by feeding it unfinished product. This model eliminates the majority of physical labor as well as the risk of repetitive injuries. At the same time, young workers are more attracted to companies in traditional trades such as woodworking when technology is part of the process. In short, cobots make woodworking cool again, especially to next-generation workers.

For the employer, cobots can be customized for deployment into woodworking applications. UR cobots, for example, can auto-program sanding paths for complex parts, helping to ensure consistent surface finishes for each product, improving overall quality. Precision control over the abrasives reduces costs and overhead. Furthermore, these lightweight, ergonomically designed cobots are fast and easy to deploy and re-task as demand changes. These safety and productivity improvements are prompting furniture and related wood manufacturing industries to take a second look at automation.

Take, for example, the case of AFK Garden.

AFK Garden, makers of wooden outdoor furniture in Lincolnshire, England, also faced a worker shortage while trying to keep up with increasing customer demand. In response, the company installed two ceiling-mounted UR10e cobots in its sanding workstation. Working together, the pair of UR10e cobots was able to reduce changeover time and operator fatigue, improving quality and productivity. AFK Garden's productivity gains allowed the company to recoup their robotic investment in less than 12 months.

Before we installed the robots, we never saw one product sanded the same way.
Now, every single piece of furniture is identically sanded, our product quality has exponentially increased.

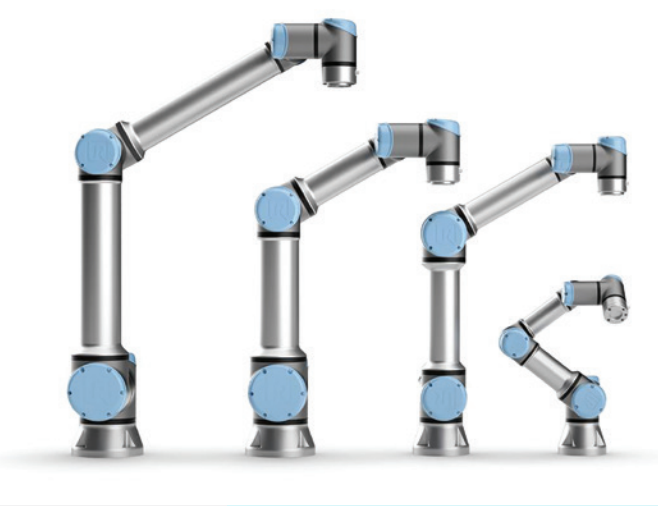
Martyn Mitchell
Factory Manager
AFK Gardens

"Before we installed the robots, we never saw one product sanded the same way," says Martyn Mitchell, factory manager at AFK Gardens. "Now, every single piece of furniture is identically sanded, our product quality has exponentially increased."

AFK Gardens use the UR cobots on 10-15 different pieces of furniture. "Programming the sanding of each new product takes just a couple of hours," explains Mitchell. "We simply trace the robot arm along the product, "teaching" it the trajectory, adding way points, adjusting the robot's force control to where we want less and more of it." When the company needs to switch between products, the operator simply hits play on the stored sanding program for that particular product on the robot's teach pendant.

The two UR10e cobots are outfitted with the Mirka® AIROS, a lightweight sanding head that integrates directly with the UR cobot arm through a "URCap"; a software handshake between sander and cobot arm that enables the user to program the sander directly from the cobot's teach pendant. To extend the reach of the UR10e cobots, AFK Gardens added the 7th axis slide kit from Ewellix, which also comes with a URCap for easy integration with the UR cobot,

"We were able to extend the cobot's reach about fifty percent," says AFK Garden's factory manager. "Installing these robots has been a brilliant experience. Our productivity has gone up by 20 percent, while our operators have been freed up to from the strain of sanding to instead focus on managing the robots."



↑ The UR Cobot Family. From 3kg (6.6 lbs) to 16kg (35.3 lbs) payload, and 500mm (19.7 inches) to 1,300mm (51.2 inches) reach.

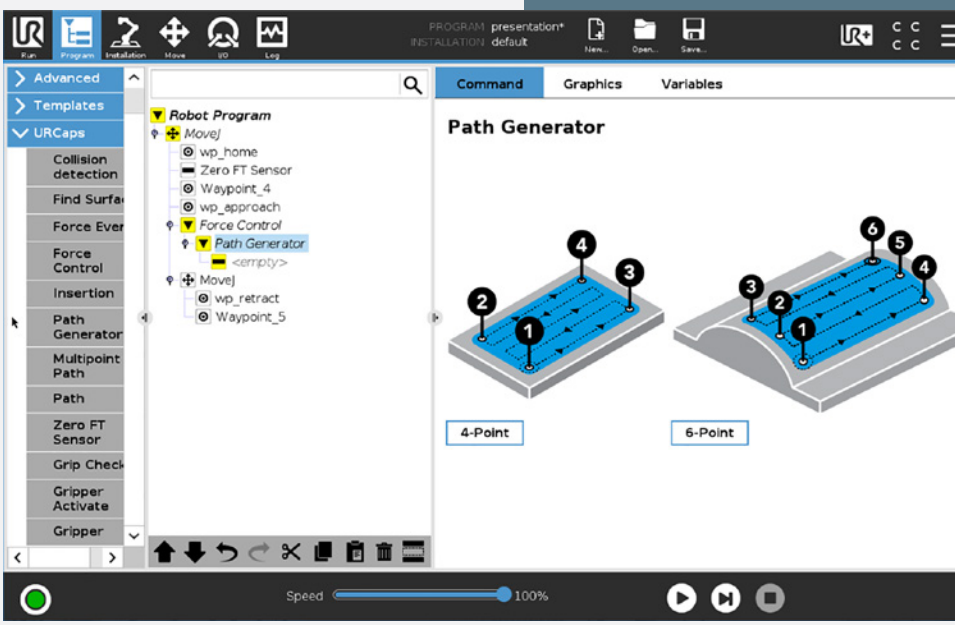
Overcoming Technology Fears

While the timber industry has long benefited from automated solutions, many furniture and other traditional wood manufacturing companies have had considerably less exposure to automated manufacturing technology. In fact, many woodworking organizations cite a lack of familiarity with automation technology as a major reason for not adopting advanced productivity solutions.

Universal Robots has overcome most of these technical concerns with a combination of intuitive programming and control systems and the UR+ ecosystem of components and application kits certified to work seamlessly with UR cobots. Both the Mirka sanding head and the Ewellis 7th axis range extender deployed in AFK Garden's robot cell are examples of certified UR+ components.

Another UR+ partner, Robotiq, had developed a full-fledged UR+ Application Kit designed specifically for sanding applications. It includes one of several Mirka or Dynabrade orbital sanders, air control accessories, a bracket for mounting the sander, sanding media, and the Finish Copilot Software, which allows woodworking companies to install a robot sanding station in just a couple of hours and to program the unit in minutes.

Finishing Copilot software from Robotiq with its built-in path generator slashes programming and setup time from days to minutes.



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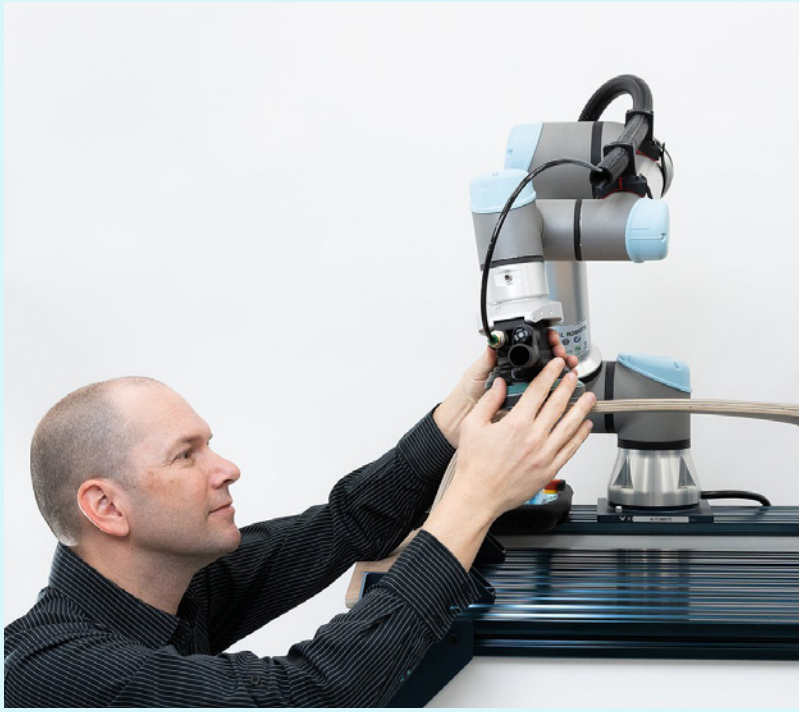
Conclusion

Need even more control over force, speed, and sander RPMs? Visit UR+ certified components and kits to check out ATI's axially-compliant orbital sander, which includes built-in compliance tolerance to smooth force variations caused by uneven, unfinished surfaces. For more control over the sander's rotational speed, consider FerRobotics active orbital kit ASF-K with even more compliance features. Have a small part that's better sanded by an external sander? Let the UR cobot hold the part using an External Tool Finishing Kit.

Today, Universal Robots is helping industries and companies that never before benefited from automated solutions to reshore operations, improve quality, fill labor gaps, and improve worker health and retention. If you have questions about how UR can help with your next woodworking project, please reach out to marketing@htetech.com.



About Universal Robots

Universal Robots is the market leader in collaborative robots.

Since introducing the world's first commercially viable cobot in 2008, UR has developed a product portfolio including the UR3e, UR5e, UR10e, and UR16e, reflecting a range of reaches and payloads. Each model is supported by a host of Plug & Produce end effectors, software, and accessories in the UR+ certification program, allowing for flexible redeployment of one robot into several diverse applications. Universal Robots has installed over 50,000 cobots worldwide, automating every manufacturing industry.

Headquartered in Odense, Denmark, UR operates out of 21 regional offices in the Americas, Europe, and Asia-Pacific.

Find out more
Click here to learn even more about automation using cobots robots with Universal Robots.

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