



// by Robert Farrell, president, Farrell MarCom Services //

ROBOTIC RUNDOWN

A Q&A discussion sheds light on the
ins and outs of robotic bending

Anyone who uses a press brake, or any machine tool for that matter, is likely familiar with the Cincinnati Inc. (CI) brand. With a 120-year tradition of quality and innovation, the build-to-order machine tool manufacturer has shipped well over 50,000 machines to manufacturers around the world.

From metal cutting to automation, the company provides a wide range of machines, controls and software. One area in which the company has forged industry-leading expertise is metalforming. CI's line of press brakes includes a wide range of recent innovations, including the company's Sheet Following System, Dynamic Thickness Compensation and RoboForm. As its name might suggest, RoboForm automates the bending process with operator-free and even lights-out production.

To learn more about CI's approach to automated bending, I was able to catch up with Todd Kirchoff, product manager of vertical motion products.

Robert Farrell: Let's get right into it with an overview of RoboForm.

Kirchoff: The RoboForm automated bending cell is a complete robotic bending system that sits in front of the press brake. The system provides complete operator-free bending operations from picking up the flat blank and performing multiple bends to stacking the finished parts on a table, pallet or bin.

What pain points lead your customers to invest in robotic bending?

Like many industries, manufacturers are handicapped by today's labor shortage. Skilled press brake operators are difficult to find, which makes them difficult to retain. Along these lines, worker absence is another production obstacle. When an employee isn't working, neither is the press brake.

RoboForm was developed to allow bending operations to continue when human operator resources are limited. In this way, a fabricator doesn't have press brakes sitting idle due to a >



“It's like the tortoise and the hare. Throughput is ultimately increased even though cycle times might not.”

// Todd Kirchoff, product manager, vertical motion products, Cincinnati Inc. //



↑ *Cincinnati Inc.'s RoboForm is an automated bending cell that was developed to allow bending operations to continue when human operator resources are limited.*

lack of operators. This even allows a single operator to run multiple jobs at once – one manually and another on a RoboForm-driven press brake.

Consistency is another big advantage. Companies often have multiple operators running the same job at different

times. One operator may set up a job differently than the next one might run it. Or, one operator's skill level may be more advanced than another. In such cases, inconsistency can creep in. Robotic bending produces each part the same way every time. This eliminates inconsistency within a given job. >

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Finally, safety is always worth mentioning. Press brakes have many important safety features, however, they can still cause injury if jobs aren't set up correctly or if an operator isn't properly trained or uses the machine incorrectly.

Is RoboForm exclusive to CI machines?

Yes, RoboForm is a small cell developed exclusively for CI press brakes. It's designed for smaller parts, so it's currently available for our 40- and 60-ton machines up to 72 in. in length. Part weight capacity is rated up to 1/4 in. The typical bending material configuration is 16 in. by 16 in., but the machine can handle blanks up to 24 in. by 24 in.

Is RoboForm dedicated to a single press brake, and if so, is it then locked into automated bending?

Each robotic cell is dedicated to one press brake. However, that machine can also be run manually. For example, if customers have a rush job that they need to run on a machine being driven by RoboForm, they can roll the cell

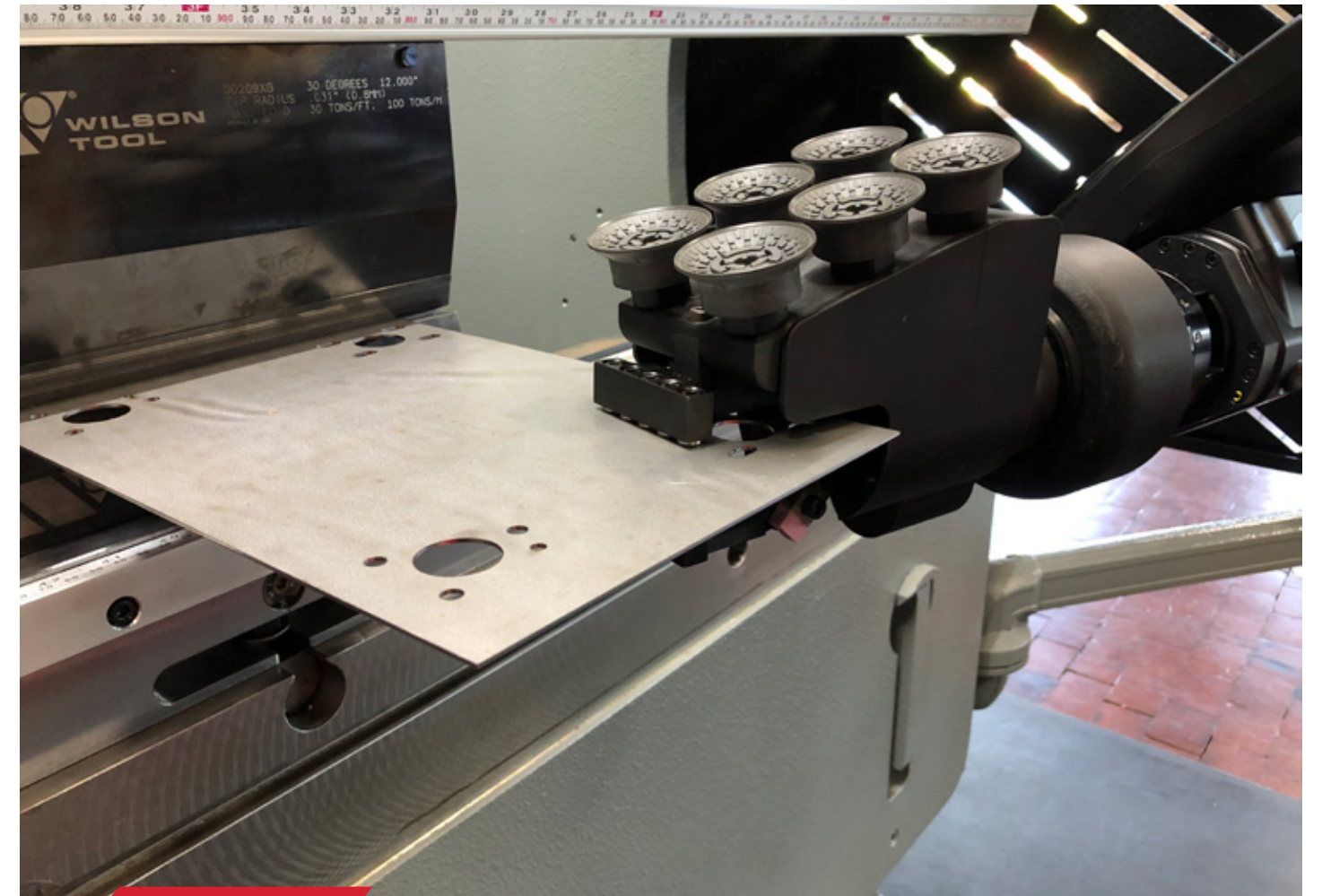
out of the workspace to begin manual operations. Conversely, if they are running the machine manually and have a job come up with a large volume of parts – where the program is ready – they can quickly slide the cell into place and let it run automatically.

Is scrap all but eliminated with the use of RoboForm?

Yes. There are probably two main areas related to scrap, which are setup and consistency. An improper setup has been eliminated because you've already proven out the program. And, with RoboForm, you bend the part correctly every time. Because the robot is doing the exact same thing every time, there's no possibility of getting out of sequence or the part being turned upside down to erroneously make a left-hand version of a right-hand part. Overall, it eliminates any number of other common errors made during manual operation.

What are some of the challenges with automated bending?

Without a doubt, the biggest challenge is gripping the parts. For starters, there are so many different types of grippers. And currently, these grippers aren't as



↑ *RoboForm automated bending cell grippers hold a part in place for bending.*

nimble or agile as the human hand.

While experienced press brake operators can instinctively look at a drawing and know right away how to bend that part or at least the sequence, it's not necessarily easy to translate that into how a robot would do that same bending. For example, you might get three or four bends into

a sequence, but then run out of real estate and have to regrip that part.

A secondary challenge is the programming itself. It would take a long time to manually program a robot by teaching it positions. Fortunately, there is software to program these robots, but it takes some commitment to become proficient with the >

programming software. For any customers that need assistance, CI can help with setup, support and training. Instruction can take place on the customer's site or here in our Greater Cincinnati, Ohio, headquarters.

What type of manufacturer is a good fit for RoboForm?

With conveyors, loaders and all the other advanced hardware and software components, automated bending can be as sophisticated and costly as a manufacturer wants and can afford. But we took a different route by creating RoboForm as a standardized product that provides a way for fabricators to get started in bending automation without a major investment. It's a relatively simple system without a lot of excessive add-ons – everything is contained in the robotic cell.

Furthermore, users load their bending material manually, which eliminates the need and expense of a conveyor system. There's also a station that allows the arm to regrip the part to reorient it to complete a bend when

needed. The robot then stacks the finished parts for pickup.

To answer the question, though, RoboForm was developed for fabricators that run a high volume of parts on smaller bending machines that don't want to break the bank to automate those operations.

So, what's the flip side? When is RoboForm not the best option?

Because of the programming involved, a shop that runs low-volume jobs almost exclusively is better served by manual bending.

And, if you're only interested in the cycle time for a particular part, you may not be a fan of a robotic press brake. Because some parts require regripping, RoboForm is not going to run a job as fast as a human. It's like the tortoise and the hare. When you consider that the machine doesn't take breaks, stop for lunch, can run lights-out and shows up for work every day, throughput ultimately increases even though cycle times might not. >



“Like most advanced fabrication equipment, robotic bending requires some investment.”

*// Todd Kirchoff, product manager,
vertical motion products, Cincinnati Inc. //*



↑ *The RoboForm automated bending cell with outbound tables paired with a 60-ton Autoform press brake on a safety platform.*

But like I said, if you're working with large machines and parts, run a lot of low-volume, one-off jobs or are obsessed with cycle times, you should stick with the manual route.

How about operator safety? Is there protective fencing?

It's all sensor-driven and extremely safe. The work area is guarded by three optical scanners. When someone

approaches the perimeter of the work zone, the robot slows down and returns to normal speed when that person backs away. The robot stops and shuts down completely when someone enters the programmed work zone.

Do your customers typically have experience with automated processes?

They do, and most often, it's with welding and laser material handling systems, but not necessarily with automated bending.

What future enhancements are planned?

We're continuing development to make RoboForm compatible with larger parts bending and on larger CI machines. We're also at work on ways to retrofit existing machines in the field with robotic bending capabilities.

What's your final advice to fabricators considering automated bending?

Manufacturers that understand and embrace automation are finding it to be a tremendous advantage. But

this type of technology is not for everyone. Look at the job-related types, sizes and volumes of parts you typically deal with. Like most advanced fabrication equipment, robotic bending requires some investment. At the same time, a robot will only do what it is programmed to do, so you'll need to have a capable programming resource. ■

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