

Technology

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A rebar-tying robot gets to work on a bridge project in Wisconsin.

Photo courtesy of Advanced Construction Robotics

Robot Performs 1,100 Rebar-Ties-Per-Hour on Wisconsin Bridge Job

TyBOT help keeps project moving on busy jobsite

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Rebar-tying robots have come to Wisconsin. Waukesha-based MKE Iron Erectors recently used one on a bridge project, a first in the state.

Developed by Advanced Construction Robotics of Pittsburgh, Pa., TyBOT performed 17,823 ties in two shifts across a 7,775-sq-ft area on the IH-39 Structure B-11-166 bridge in Columbia County, north of Madison. That's more than 1,100 ties per hour.

"We're union contractors, so we work 7 to 3:30. The TyBOT actually started working at 11 a.m. and it finished at 8 p.m.," says MKE CEO and President Barbara Sheedy. "If we were going to tie all of that rebar by hand, we would have had to have a second crew, working a second shift. The robot doesn't get paid overtime, and it just kept working."

TyBOT has already racked up some successful project deployments. It was first used commercially on a [bridge in Pennsylvania](#) in 2017. Also that year, co-founder [Stephen Muck](#) was named an ENR Newsmaker for creating the prototype. In July 2022, TyBOT tied 11,000 rebar intersections on a [project](#) in Florida.

The bridge MKE was repairing is in a congested area, so shutting down traffic lanes was a problem. "It would have been a very tight job and required a lot of manpower to get the work done," Sheedy says. "So, not only the ability to have the TyBOT tie so quickly compared to human ties, but the ability to have the TyBOT work second shift was important to us."

When Sheedy first told the Ironworkers local that MKE would be using the TyBOT, she says their reaction was negative. "When he first heard that we were doing it with the TyBOT, he went ballistic, just ballistic. 'I'm coming out and cutting up that piece of machinery.'"

But times are changing and after some negotiation, the union adopted a different tone. "When that TyBOT turned on and started moving and actually used the artificial intelligence to see the intersections where the cross sections of the rebar were and identified where the ties were supposed to go, everybody's cell phone was out, taking video and pictures and saying, 'This is pretty cool,'" Sheedy says.

"Michael Relyin, director, Dept. of Reinforcing Ironworkers, points out that in 2019, the U.S. Dept. of Labor determined that robots tying rebar is an evolution of existing tools and methods used by reinforcing ironworkers. This means that work performed in conjunction with rebar-tying robots shall be performed by workers classified as "reinforcing ironworkers." The Iron Workers Union is committed to training and preparing their members to do this work."

"The Iron Workers Union is committed to preparing our members for these jobs," Relyin adds. "Our local training programs have worked with the makers of TyBOT to train our members. There are several other rebar-tying robots in various stages of development, all of which we will be prepared to work with."

The best way to persuade workers that robots aren't a threat is to point out how machines can make life better, Sheedy says. "I say to the guys all the time, you guys are athletes. If you're going to play in this game as long as Tom Brady has, you have to take care of yourself. Whenever your ass is above your heart, that is not a healthy position to be in. The TyBOT can save you from that."

Making Friends with Robots

There are three steps to getting potential customers to accept the TyBOT, says Danielle Proctor, president and CEO of Advanced Construction Robotics. These guidelines also are good for winning over workers.

First, get the customer to take a look. "Getting a robot on a jobsite to show it works has been a huge win for us," Proctor says. "We come in with the TyBOT on a 40-foot trailer; we lift it on your bridge; and it starts to work."

Second, prove that the machine can do the whole job. MKE's relatively small bridge job is a perfect example, Proctor says. "We showed them that it actually works, and then they started saying, 'OK, if we do a couple of little tweaks, it could do more and do it faster.'"

Third, gain trust. "A lot of it comes down to planning and scheduling. And I'm not talking about BIM (building information modeling) input. I'm talking about deciding to shift different concrete pour dates to allow the technology to work at a high utilization rate. We have customers who are trusting [the TyBOT] so they're organizing their rebar delivery schedules and pre-planning bundle placements so that they can save critical time."

In the end, it comes down to everyone embracing the new and unfamiliar. Or as Sheedy says, "As a business owner, I am not going to be competitive if I am a Neanderthal and don't look forward and consider all the opportunity that is available to me."