

# Roadtec

## Case study: Metal Fabrication

### Application

Material handling, arc welding

### Products

Cold planers, material transfer vehicles and asphalt pavers



## Paving the way to smoother road resurfacing

**If you've ever encountered a road resurfacing project while traveling in the United States, chances are good that you've observed Roadtec equipment in action.**

> Roadtec is one of a consortium of 16 companies that make up Astec Industries Inc. Following the lead of Astec Underground into robotic manufacturing, now Roadtec is building its mills using ABB Robotics. Company executives anticipate doubling production levels and enhancing uniformity, thanks to the technology provided by ABB through Wolf Robotics of Colorado.

"We will actually have to add one more person to the production team," says Mike Bliss, director of manufacturing for Roadtec. "But the output will change. The biggest thing will be the reduction of man-hours. We'll go from about 120 hours to 60 hours to make a mill drum. That will let us produce twice as many drums as we were

making, and we think we'll be able to tweak that even more once we get into routine production."

Rhey Houston, a fixture designer with 15 years at the company, undertook the task of researching companies that could fulfill Roadtec's needs. "I went right to the Internet and found Wolf Robotics," he says. "They seemed capable and had all the answers we needed." Best of all, the company had been around since 1944, had once been owned by ABB Robotics and was now an integrator of ABB products.

**Roadtec began working** with Wolf in June 2007, designing two robots to build its 900 series mills – the >

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- biggest cold-planing equipment it makes – for highway resurfacing. Houston reports that Wolf’s customer support was fantastic throughout the process. But by the time the equipment was designed and installed in March 2008, Roadtec’s buyer requests had shifted from large equipment intended for highway reconstruction – the 900 series machines – to smaller mills better suited for private roadways and narrower applications. Luckily the robots flexibility meant they can work for other mills as well, continuing to provide Roadtec an advantage.

Wolf designed the initial software, but Roadtec staff programmers do the work of recalibrating it to meet the varying dimensions of the products in current demand. The 500 and 700 series mills, made for narrower roads, are the hot items in today’s market. The robotic equipment can meet the need. “A robot can make numerous repetitions of parts, and it will make every one of them identical,” says Houston. “It helps our sales because the customer knows that every mill will be the same. It will decrease our manpower to load blocks on the drum. In turn, we have to make special preparations for the robot as well. We have to make sure everything is exact, or it won’t work for the robot.”

**Roadtec uses an IRB 4400** material-handling robot to pick up the pedestal blocks and teeth and place them on the drum. From there an IRB 2400L six-axis welding robot secures the blocks and teeth in place. The two robots are mounted side-by-side to a floor track system that is used to transport the robots between the staging area for the pedestal blocks and the milling drum. The



The operation to place and weld the teeth takes 10 hours, manually the process would take up to 100 hours.

### > FACTS

#### Benefits of Robotization at Roadtec

- **Decreased production time:** Roadtec expects to produce drums in half the time.
- **Increased production output:** Building twice as much product.
- **More uniform product:** The welding robot creates a cleaner line, the same way every time.
- **Safety:** The robot works in a completely enclosed system, keeping smoke, welding glare and loud noise inside the system and away from workers. This helps reduce eye burns from welding.
- **The steel drum, which is very shiny, causes a hazardous glare of welding sparks. Fewer workers are exposed to the glare in the contained environment.**
- **Roadtec sold 95 machines in 2007, building 50 to 60 percent in house and purchasing the remainder for resale. In 2008, Roadtec projects sales of 110 mill machines and expects to make more of them in-house, thanks to the robot installation.**

IRB 4400 robot has a gripper end tool that picks up a pedestal block and then places it in a location jig where it reorients the part to ensure accuracy and then it swings around and holds the block in place on the drum as the IRB 2400 robot reaches in and tack welds the block to the drum in three locations. Once secured the IRB 4400 releases from the block and goes back to pick another block from the staging area. The drum rotates to present a new location for the next block and the process is repeated. When all blocks have been placed and tacked the IRB 2400 robot then returns and completes the welds on each block. The operation does not require the robots to move simultaneously with each other. But they need to be aware of each others location and projected movements. Done manually, the process takes up to 100 hours to place and weld the teeth, but the robot can get the job done in 10 hours or less. “Do the math,” says Houston. “It doesn’t take long to start making money that way.”

The robotic process creates a more uniform, better-refined finished product as well. Houston points to a pair of drums, one with blocks welded by hand and a finished drum that was set and welded by the new robots. The difference in workmanship is evident. The manually welded piece is rough and inexact, while the robotically produced product is smoothly welded, each tooth perfectly placed in a spiral around the drum. ☉