S cuzza me, but you see, back in old Bellingham, that’s automation. That slight variation of the old Dean Martin tune makes a lot of sense for Wood Stone Corp., Bellingham Wash. The maker of wood-fired ovens has experienced dramatic growth since it first began making its own version of a wood-fired stone hearth oven that could stand up to the rigors of U.S. commercial kitchens in 1990. The company’s technologically advanced ceramics and engineer expertise have helped its products grab considerable market share and earn their places in restaurants such as Carrabba’s Italian Grill, California Pizza Kitchen, and Wolfgang Puck’s many establishments.

Over the years the product line has expanded as well. Wood Stone now makes rotisseries, charbroilers, and tandoor ovens. By the end of 2008, company management expects to have in excess of 8,000 installations in more than 60 countries.

Learning Lessons Along the Way
Keith Carpenter is a quick study. After all, he was inspired to chase the dream of making wood-fired ovens in 1989 after only one customer asked him about the availability of such products. As a manufacturer’s representative for 12 companies in the commercial kitchen industry, he couldn’t think of any. That led him to contact Harry Hegarty, who at the time was building large-scale, high-temperature ceramic incinerators for the forest products industry, and the result was the burgeoning commercial appliance-making company.

Another result was a company that didn’t do much of its own fabrication. Wood Stone did some punching and welding of angle iron, but contract manufacturers in Canada and Washington did all of the sheet metal fabrication.

“We would engineer the ovens, have our vendors fabricate the parts, and then assemble the final products at our facility. In our early years, we concentrated our investments in ceramic engineering and manufacturing equipment,” Carpenter said.

As Wood Stone grew in sales over the years, the dollar amount for outsourced fabricated products grew to nearly $4 million per year. That spurred the company to look at ways to reduce manufacturing costs, while simultaneously improving delivery times and boosting quality efforts.

Automation helps ovenmaker cook up profits
Wood Stone Corp. learns valuable lessons as a result

A robot removes a part on the combination laser/punch machine.
The opportunity to jump into metal fabrication presented itself in 2007 when the company doubled its facility size from 60,000 square feet to 120,000 sq ft. The search for automated sheet metal fabrication equipment began.

“We purchased a 4-foot shear and a press brake to get our feet wet, but concentrated our search on automated systems,” Carpenter said. “The plan was to visit five different shops with equipment from various manufacturers.”

Wood Stone’s first stop was Nu-Way Industries, a contract manufacturer in Des Plaines, Ill. It was also the last stop.

Nu-Way had a fully automated fabrication system with a giant automated storage and retrieval system for sheet metal, manufactured by Finn-Power International Inc. “I knew that we had to do what Nu-Way was doing because anything short of that would be going backwards,” Carpenter said.

That’s the first lesson Carpenter learned about automating fabrication processes. He learned others after placing his order in December 2007 for a Laser Brilliance® with a loading/stacker robot; Night Train FMS® material management system; EBe automated bender; and three servo-electric E press brakes, one of which was manned by a robot. Wood Stone began fabricating metal parts in the beginning of 2008.

**Lesson: A Combination Machine Can Increase Efficiency**

The Laser Brilliance combines a 30-station, 33-ton turret punch press with a slab CO₂ laser capable of generating 2,500 W of power. The combination machine gives Wood Stone the ability to use the turret punch press for repetitious parts or when speed is needed, and the laser when intricate cuts are needed. The machine also can handle a variety of sheet metal thicknesses—up to 0.312-inch carbon steel and 0.250-in. aluminum.

The machine has a 250-in.-long X traverse, four clamps, and high positioning capabilities, which make forming and tapping possible. Because of linear-drive technology behind the punching and laser cutting head, good positioning accuracy and, consequently, repeatability in each work stage are maintained.

A loading/unloading robot ensures material is always ready to be put in place for punching and laser cutting once the finished parts are removed. The automated material handling movement helps reduce production time by 30 percent to 60 percent when compared to traditional manufacturing systems without automation, according to Finn-Power officials.

**Lesson: Don’t Underestimate the Impact of Automated Material Movement**

The centerpiece of the automated sheet processing system is the Night Train FMS, which is the inventory and material transporting center. The system not only supplies raw material, but also removes and stores work-in-process.

“There have been CNC lasers and punch presses around for a long time, but tying them together with the Night Train makes them all one big machine,” Carpenter explained.

Daric Nellis, a Wood Stone manufacturing engineer with extensive experience with Finn-Power and other fabrication equipment, said this type of automation reduces labor costs dramatically while also improving quality.

“We can run the Finn-Power system with four people. We would need 30 people to fabricate the same volume of product that we can produce on the automated system,” he said.

“None of these employees had prior sheet metal fabrication experience before joining us. The software and the ease of interface between the person and the machine allows this to happen. We are programming offline, so the experience that is needed is taken care of in the office,” Nellis said.

One person who has all the years of experience and knowledge doesn’t have to handle every single part in order to get a quality part out, Nellis added.

The software also gives the front office a picture of the production process. Company management can see what mate-
Keith Carpenter (left) and Harry Hegarty founded Wood Stone in 1990.

A robot easily handles larger parts that used to require two men to set up in the press brake.

Material is in the material management system and what parts are in process.

**Lesson: Automated Benders and Press Brakes Can Live in Harmony**

The servo-electric EBe Express Bender completely automates the bending operation, from the loading of flat parts to unloading of the components. It is designed to handle parts as long as 100 in.; as wide as 60 in.; and as thick as 11 gauge for carbon steel, 13 gauge for stainless steel, and 9 gauge for aluminum.

The bending cell has a maximum bending length of 100 in. and a maximum opening height of 8 in. Instead of hydraulic cylinders, NC servo axes control the actuations of the bending blade—both vertical and horizontal—and upper tool movements.

On the outskirts of the Night Train material management system, the robotic E press brake handles parts that have flanges more than 7.9 in. and are thicker than the EBe’s capacity. A patented, mechatronic drive, based on the pulley principle, is designed to deliver an even distribution of forces in the top beam, high accuracy, increased productivity, and decreased energy consumption. The press brake’s frame concept makes it possible to utilize the backgauge system across the entire working length. Because a robot mans the press brake, two-man operation for heavy components is eliminated.

**Lesson: Payback Comes in Many Different Ways**

“We outsourced $4 million of parts with subcontractors in 2007,” Carpenter said. “This year we produced half of these parts in-house. By the end of 2008 we should be doing 90 percent in-house. In five months, we are halfway to having the system pay for itself.”

Savings are coming in other ways as well:

- Before the automation investment, Wood Stone had to live with the limitations and lead-times. As a result, it had to order batches of parts that far exceeded what it needed because it couldn’t risk having vendors getting too busy to supply the parts. Ultimately, the company is planning a 75 percent reduction in inventory when all production is brought in-house.
- “We have re-engineered many parts with tighter tolerances to be better and more cost-effective than what we were getting from the job shops,” Carpenter said.
- Wood Stone used to waste time struggling in assembly with outsourced components that didn’t meet specs. Today the company’s accuracy...
“We have re-engineered many parts with tighter tolerances to be better and more cost-effective than what we were getting from the job shops.”
—Keith Carpenter, Wood Stone Corp.

Wood Stone’s pizza ovens are found in restaurants all over the world.

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