



Figure 1 Aluminum is used for the frame of Orion Energy Systems' lighting products because it conducts heat five times better than steel. Photos courtesy of Prima Finn-Power North America Inc.

Bright lights, big opportunity

Automation helps lighting manufacturer keep up with its growing business

Orion Energy Systems is a company that doesn't take its business lightly. A Plymouth, Wis., company that started out in 1996 as a small manufacturer of lighting products for the agricultural industry is now considered to be a technology leader in the field of energy-efficient industrial and commercial lighting (see **Figure 1**). It has 235 employees in a 266,000-square-foot facility in Manitowoc, Wis., and opened a 70,000-sq.-ft. technology center on Earth Day, April 22, which was meant to symbolize the company's energy-efficient products. This new facility serves as Orion's

headquarters and operations center, as well as a national destination for educational institutions and businesses to learn about energy-efficient lighting options.

The business really took off in the early 2000s with the launch of the company's alternative to old-fashioned and inefficient traditional light fixtures. For example, Orion President and CEO Neal Verfuert designed and patented the Illuminator, a high-intensity fluorescent lighting product, in 2001. The product's aluminum frame, ventilation placement, and reflector design optimized the way heat is conducted and radiated and light is dispersed.

After the company installed its lighting products in facilities for Toro Manufacturing and Bemis Manufacturing, the ensuing successes solidified its design reputation. (Bemis claims to save almost \$318,000 annually because of the Orion lighting.)

In another example, the company developed its Apollo® Light Pipe (see **Figure 2**) that, when positioned on a roof, collects light and feeds it into building interiors through "light pipes." Orion officials promote the fact that when the technology is combined with its controls, lighting energy consumption can be reduced to nearly zero.

The installation successes and continued technology development have fueled a torrid growth path over recent years. Orion now has installed its energy management systems in more than 4,700 facilities in North America, including 119 *Fortune* 500 customers. Orion reports that its technology has displaced more than 460 megawatts, saving customers more than \$642 million.

Growth, of course, brings new challenges from a manufacturing perspective. In its early years, Orion used contract manufacturers for all of its sheet metal fabrication production for its small product line. By the early 2000s, the company's diverse line of energy-efficient products strained that supply chain approach, particularly as Orion sought to adapt just-in-time manufacturing principles.

"It took about a week to get product from the job shops," said Ron Ernst, Orion's vice president of manufacturing. "In the early years, we were changing product nearly every week with the design changes."

A decision finally was made to bring all of the manufacturing activities in-house. In 2005 Orion acquired the Manitowoc facility and began to set up the shop floor. The first purchases were a Finn-Power C5 turret punch press and a servo-electric E series press brake (see **Figure 3**).

"This was the first sheet metal fabrication equipment that we purchased," Ernst explained. "That same year, we acquired our first roll former, and we began making our own reflectors."



Figure 2 The Apollo® Light Pipe captures sunlight through its dome, feeds the light through a sealed "light pipe," and focuses it into a building, eliminating the need for electrically generated light for part of a day.



Figure 3 A Finn-Power C5 turret punch press and a servo-electric E series press brake were the first pieces of metal fabricating equipment Orion purchased when it moved its fabrication activities in-house in 2004.



Figure 4 The acquisition of the C5 Compact Express with automated material loading and unloading in 2006 addressed workers' fatigue associated with moving the large sheet metal blanks.



Figure 5 As enclosures have become a bigger part of its business, Orion has found that its automation investments, such as its robotic press brakes, have helped it keep up with the growth.

More Than Punching

The 20-station, 33-ton C5 hydraulic turret punch press has a maximum sheet capacity of 50 in. by 100 in. Orion has five autoindex stations and one 24-station Multi-Tool in the turret punch press.

"By the sheer volume of parts that we nest on a sheet, the autoindex station is a big benefit," explained Troy Johnson, business unit manager.

The turret punch press has full-tonnage, indexable upforming, which allows complex forming operations to be made quickly using a single forming tool. The equipment's design allows forming heights up to 0.62 in., with the forms made by the die moving upward and then retracting.

"Before we had access to [this] upforming feature," Johnson said, "everything on the ballast channel was a screwed-together assembly with a lot of hardware and fasteners. Today the upforming stations creatively do the job with snaps and catches. We redesigned the product to make it modular. We now offer a removable power pack that can be replaced without any tools.

"With the reduction of hardware, our volume in assembly has increased. We also eliminated a metal cross member for a 6 percent savings in aluminum," he added. "We're able to save material and labor while making it a modular unit, which results in lower maintenance for our customers."

The turret punch press, capable of nibbling up to 1,100 hits per minute, has optimally positioned gauge pins for simplified loading of blanks. It also incorporates automated clamp setting technology that positions the sheet clamps according to the numerical program.

The E series servo-electric press brake has worked out well for Orion as well. The press brake has a patented mechatronic drive that is based on the pulley principle, a system with fixed and moving rolls spread over the total working length of the upper beam with a belt. Finn-Power officials have stated that this approach virtually eliminates ram deflection and the need for compensating bed crown and results in an even distribution of forces in the top beam. The frame concept makes

it possible to utilize the backgauge system across the entire working length.

"The equipment has worked out great," Johnson said. "We were able to start rapid prototyping of product. We could switch ideas on-the-fly and not get stuck with someone else's lead-times."

Time to Automate

In the fall of 2006, Orion purchased a C5 Compact Express and the robotic E series press brake.

"We decided to automate both the punching and bending to eliminate the fatigue our operators were experiencing from manually loading and unloading the large sheets and enclosures," Ernst said.

The C5 Express (see **Figure 4**) adds unattended operation to the C5 turret punch press through compact load/unload automation. Space above and below the machine is utilized for material holding and staging. Simultaneous loading and unloading is possible during processing.

The robotic press brake (see **Figure 5**) easily handles the large parts that proved awkward for typical press brake operations.

The automation has proven useful as Orion's business has changed. When the automated turret punch press and robotic press brake were purchased, lighting enclosures accounted for only 10 percent to 15 percent of the company's business. Today they account for 50 percent, according to Johnson.

"We were producing 500 fixtures a day. Today we build 3,300 compact modules, 1,200 enclosures, and 5,000 fixtures in an eight-hour shift," he said.

The company added a second C5 Compact Express and robotic E press brake in January 2009.

Bright Lights Ahead

To be sure, Orion has achieved an enviable record of technological achievement and financial growth. The company's energy-efficient products have won numerous awards, and Orion also was recently recognized by the White House for its advances in clean energy and energy efficiency. On the financial side, the company's sales reached \$80 million in 2008.

The new equipment has allowed Orion to keep up with these dramatic changes. The company used to have only 10 models of fixtures back in 2004, but now it has 200 different models. Because of its investments, it can respond quickly to customers' demands and marketplace trends.

"Without flexibility in today's market, you're sunk," Ernst said. **FAB**

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