Degelman Produces With 4400 MAX

Manufacturers who provide a wide variety of agricultural equipment products can be found throughout North America. The Western Canadian province of Saskatchewan is no exception. A population of just over 1 million people occupies nearly a quarter of a million square miles in "The Land of Living Sky." Recognized as a world leader in dry land farming technology, thousands of skilled workers make products used for tillage and rock removal, spraying and fertilizing, livestock and forage, zero- and minimum-tillage seeding, and grain handling, storage and transportation.

One of these highly regarded agricultural manufacturing companies, Degelman Industries, is located in Regina, the capital city of Saskatchewan. In 1962 on the family farm in Raymore, Wilfred Degelman developed a uniquely designed rock picker and founded the company that bears his name. A move to Regina in 1966 began a series of expansions. Dozer blades were added in 1969 and commercial rotary mowers in 1998. Their current product lines include land levelers and rollers, strongboxes for snow removal, rock rakes and diggers, and straw control machinery.

Serving the Market

The products that Degelman Industries manufactures are developed after direct communication with the markets they serve. Face-to-face meetings with farmers at agricultural products shows give rise to new ideas. The company considers four factors when deciding if a product should be developed: Is the product salable? Does the product fit into current manufacturing capabilities? Can the product be manufactured at a competitive cost? Is there a readily available market for the finished product? Key to the success of a new product is quality and durability, and each is heavily field tested and scrutinized in a development cycle of six months to two years.

Top left: Degelman RC1510 Rotary Cutting machine in transport position.

Bottom left: Degelman Rock Picker

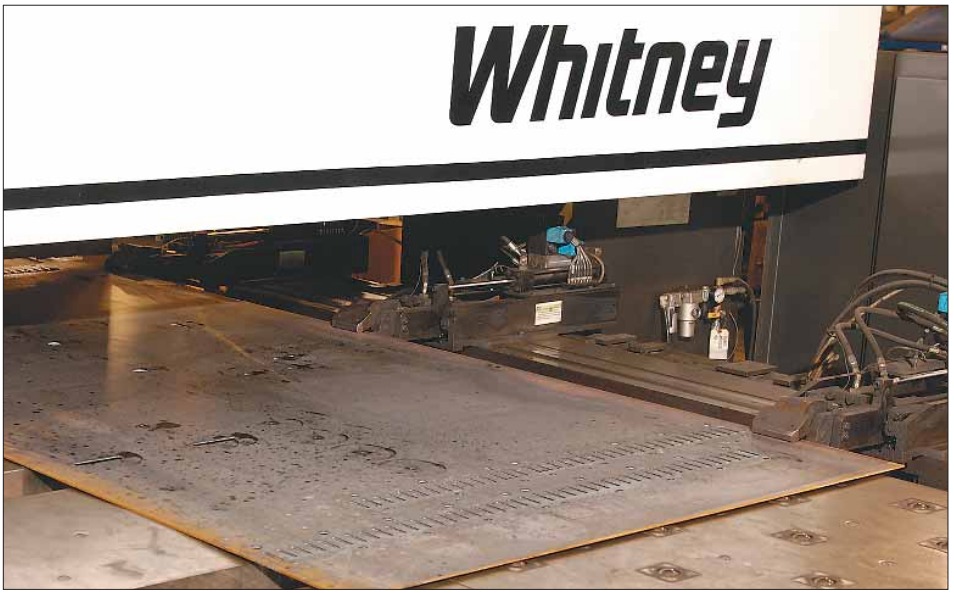
Retractable work clamps allow for full sheet utilization without clamp strips or dead zones.

Degelman Industries occupies 128,000 square feet and employs 140 workers. Privately held and family owned, Degelman continues to head the company as president, and his six children oversee daily operations including research and development and plant operations. The Saskatchewan labor market supplies a wealth of skilled labor, many of whom come from rural backgrounds and farms. Within the family of current employees, 30 percent have seen over 25 years of service at Degelman.

Traditional methods of manufacturing—shears and oxy-fuel cutters—were used during the early years. As the company expanded, cleaning and painting operations were added and machinery was upgraded. Production requirements and quality expectations demanded that Degelman move to robotic welding. Blair Flavel, operations manager, recalls that traditional manufacturing equipment could not support robotic welding requirements and moved the company into advanced manufacturing technology. Today the plant is populated with CNC milling machines and lathes, multi-axis press brakes, CNC plasma cutters, and CNC punch/plasma.

Left: Plasma cutting with 400 amps. Right: Compression bushings are pressed into a punched and shaved hole at the 4400 MAX.

Customer expectations have led to the implementation of some lean manufacturing concepts. Degelman has reduced lot sizes by a factor of ten. Flavel says that the key is coordination in all aspects of operation. They use a minimum/maximum system whenever possible, both in production and in purchasing. One problem with lean con-



Degelman uses the 4400 MAX for gage through 1" material.

cepts, he believes, is that it does not adequately level the load in seasonal markets. Degelman's philosophy is to run in batches large enough to allow reaction to customer demands within seven days yet small enough to equalize production throughout the year and keep production costs competitive.

Searching for Power, Speed and Flexibility

The need for a fast and flexible operation demanded a study of new fabrication manufacturing processes beginning in 2000. The staff was in place and prepared. All that remained was finding the right piece(s) of equipment.

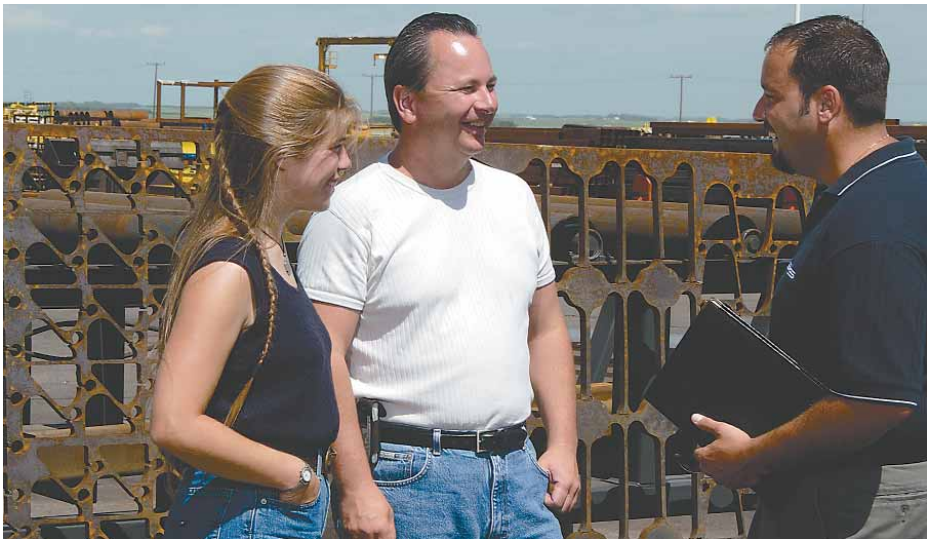
The first step was determining the type and thickness ranges of the materials moving through the shop. Much of the load was in 7 gage mild steel, but most work centered on nearly equal amounts of 3/8", 5/8", 3/4", and 1" steel. Any considered solution had to process all of the thicknesses effectively. A second concern was the need to produce a high quality, straight hole of 1.25" diameter through 1" plate. Degelman uses a compression bushing to improve their product reliability and durability. Unfortunately, a traditional punched hole had too much break out, a plasma cut hole was too inaccurate, and a laser cut hole was too expensive. Drilling and machining historically produced the best hole.

Degelman was also faced with a tremendous amount of outsourcing. Blair Flavel understood that outsourcing could reduce capital investment costs by minimizing the number of machines required, but that it also reduced direct control over production run sizes, quality, response times, and costs.

Laser technology was sometimes used to cut many of the parts that Degelman outsourced. Although the costs were often high, they could be less than in-house production costs that were burdened by multiple set-ups for numerous secondary operation and non-value-added material handling. With the advances in laser plate cutting technology, it was natural that laser-cutting machinery would be a priority. A visit to the International Manufacturing Technology Show (IMTS) held in Chicago, Illinois in 2000 presented a wide array of lasers that might support their operations. It was at this time that Degelman witnessed the capability of punch/plasma equipment. The machine shown at the Whitney booth (a 3400 RTC) was able to process a maximum of 1/2" thick material, but information describing the recently introduced 4400 MAX compelled them to visit the nearby Whitney factory to see the machine up close.

The Whitney 4400 MAX

Specifications for the 4400 MAX are impressive. It has 100 tons of hydraulic punching force that can successfully fabricate material from 14 gage through 1". It has a working envelope of 96" x 160" that supports larger part sizes. An optional Hypertherm HT4400 oxygen plasma system cuts at very high speeds (70 IPM in 1"; 160 IPM in 1/2"), surpassing the cutting speeds of laser by a factor of two or more. Edge quality and accuracy were well within requirements and dross-free cutting could reduce the amount of grinding. Blair Flavel was well acquainted with plasma cutting but his prior experience with older systems brought some skepticism. Morris Elynuk,



Degelman Programmer Glenna Herman and Operations Manager Blair Flavel join Wallace Machinery Sales Representative Dan Joss in a discussion of the 4400 MAX.

who supervised the production floor, also questioned whether the 4400 MAX could truly perform as advertised.

Whitney prepared numerous time studies that documented actual floor-to-floor part times. Initial results showed a possible production rate for punch/plasma that was three times that of the laser. Estimated scrap rates were 10 percent that of their current traditional methods. Furthermore, when compared to stand-alone fine plasma cutting systems, production requirements (for the sample) dropped from 50 percent of capacity to 6 percent—one machine could replace several!

Production costs drive profitability. A typical 1/2" part that was costing $15.94 to produce with current methods would drop more that 50 percent to $7.47 by using a laser. Significant. But that same part would cost only $3.14 if made on a 4400 MAX—a reduction of 80 percent. Similar results were seen in a typical 1" thick part—traditional processing cost $4.66; laser processing cost $3.73; punch/plasma processing cost $1.66. The economics were clear.

A challenge remained, however. A major part of the justification included eliminating the secondary processing required to make the 1.250" diameter holes in 1" plate. Whitney produced a sample part that demonstrated the technique of punching and shaving to achieve the straight sided holed needed for the bushing. This involved pre-punching a hole smaller than the desired finished diameter, and then re-punching the same hole with a punch of the final diameter along with a die of minimum clearance. The result was a hole with straight sides suitable for the bushing.

Eighty percent of robotically welded assemblies are produced on the 4400 MAX.

During the sales cycle, the Whitney distributor for Saskatchewan, Wallace Machinery, worked directly with Whitney to provide information and samples. Dan Joss even drove sample parts from Winnipeg to Regina late one night. The process was validated and verified by demonstration. The 4400 MAX was justified financially. They installed their machine in August of 2002.

Efficient Production

Today, 90 percent of Degelman's sheet and plate is first processed by the Whitney 4400 MAX. They have eliminated shearing as an operation, keeping only a single shear for utility work. The greatest impact has resulted from the punch and shave operation that produces the bushing holes. Instead of requiring multiple secondary operations, the compression bushings are now installed by the operator of the 4400 MAX immediately after the parts come off of the machine.

Half of the parts are created in disposable, ever changing nests (dynamic nesting) to accommodate fluctuations in demand. The remaining parts are made from fixed nests (kit nesting) that supply common product components. Glenna Herman utilizes SigmaNEST® to support the five or six nests per day that are required. They have a library of nearly 8,000 part numbers and create about 10 new part programs each week. Operators like the Whitney a lot. The old plasma only table was dirty and slow. The 4400 MAX is fast, reliable, and clean.

Would Degelman Industries purchase another 4400 MAX if needed? Blair Flavel says yes, indeed!

"We probably wouldn't consider anything other than punch/plasma for future needs. The accuracy on punch/plasma is more that good enough to accommodate robotic welding. 80 percent of everything we robotically weld comes off the 4400."

The Whitney 4400 MAX currently runs 20 to 24 hours per day, seven days per week. Degelman allows four hours per week for routine maintenance and the operators are responsible for daily upkeep and cleanliness. It has been integrated into their lean manufacturing concepts and runs multiple families of parts with low lot sizes without the cost penalties incurred by traditional manufacturing.

Degelman Industries is known for their innovation, product quality and durability, and customer support. The addition of a 4400 MAX to their operation places them in the forefront of manufacturing technology in "The Land of Living Skies." ◆