

HEAT WAVE

A custom-engineered hydraulic press supports an innovative process in a forging environment

According to the United Nations Food and Agriculture Organization, the world will have to produce 70 percent more food by 2050 to feed a projected extra 2.3 billion people. In the last two decades, practices like monocropping fields with genetically uniform seeds that are herbicide tolerant and insect resistant, plant spacing and row arrangement have emerged to boost crop productivity.

High-tech farm equipment has evolved to keep pace with fabricators that produce parts for today's high-dollar machines. Doug Bruce, president and owner of Osmundson Mfg. Co., Perry, Iowa, says better equipment is a contributing factor to bigger crop yields. "A grain drill planter, for example, can cost upwards of \$150,000. These machines have to be very precise. If a farmer decides to plant corn 2 in. deep, the equipment has to meet that requirement without deviation. Precision planting and really good parts are critical."

The fourth-generation family-owned enterprise has been nurtured from smaller-scale production of tilling spades and tools to leading the industry as the only U.S. manufacturer of disc, seeder and coulter blades. Bruce says personal involvement, loyal customers, a dedicated workforce and a little ingenuity continue to provide solid footing for the century-old company, which sells a variety of high-speed tillage tools to a range of customers, including U.S.-based OEMs such as John Deere, Case New Holland Inc., Great Plains Mfg. and Kinze. The fabricator's quality products also have positioned Osmundson to export its goods to China, Europe, Canada and Russia.

Looking to increase production and eliminate process steps, Osmundson chose to invest in a Beckwood custom-



The Beckwood five-post, dual-ram press requires less steps and motion from operators.



Part is fixture-quenched with water.



After forming and fixture-quenching, the part is removed from the process.

engineered, five-post, dual-ram hydraulic press to support an innovative forming and fixture-quenching operation. Beckwood Press Co., St. Louis, engineers and manufactures made-to-order hydraulic presses in virtually any configuration for a variety of applications and industries.

More parts per hour

“If you can make more parts per hour, you can counteract lower-cost offshore labor,” Bruce says. “Our goal is to make more pounds per hour, per person, than can be accomplished with offshore labor.” Traditionally, the fabricator’s rigorous forging

environment dictated the purchase of used, single-ram, same-size presses to support conventional heat treating, forming and quenching processes.

“When you are in the forging business, presses tend to get consumed. The steel, heat and moisture create rough conditions for equipment. This meant we were continually looking for two same-size presses that were small and fast. Most of the presses we found were housing types, not four-post. We had to take what we could get in terms of specifications.”

Once heat-treated-and-formed parts were removed from the used mechanical machines, they were placed in a quenching tank. Because quenching sometimes caused warping, operators were required to perform quality checks and additional forming in a second press. Multiple steps along with the larger footprints of the single-ram presses added costly minutes to production. To eliminate some of its secondary processes, the fabricator designed special tooling that would permit forming and fixture quenching to occur in one step inside the press. Then the fabricator went shopping for its first new press, one that actually didn’t exist yet.

“Osmundson came to Beckwood with a very specific list of press features,” says Darrell Harrelson, technology director for Beckwood. “And most of the items they were looking for didn’t lend themselves to a traditional hydraulic press. Initially, we presented a concept for a six-post press with front and rear posts centered between two rams. After working closely with Osmundson to fully understand their application requirements, the final configuration incorporated a five-post design with a single post on the press centerline. This customization improved ergonomics for machine operators while maintaining an optimal working height. The approach was somewhat unconventional, but our goal for each project is to listen to what a customer needs and develop an application-specific system as opposed to a ‘best fit’ prepackaged solution,” he says.

Hydraulic Presses

Eliminating production steps

The five-post, dual-ram press was installed in March 2011 and runs a six-day, 24-hour schedule. Disc and grain-drill blades are formed and fixture-quenched in the press from a boron grade of steel specifically developed to work with Osmundson's heat-treating process. Heat treating and fixture-quenching hardens steel, allowing parts to withstand breakage and remain sharp when impacting the soil repeatedly. Press speed is a key step to the process.

Parts leave the furnace at 1,700 degrees Fahrenheit and are loaded manually into the press. The machine's ability to close on the part and form it quickly allows the quenching step to be initiated while the part is still hot. This improves part quality, averts heat from being transferred into the tool or the press and prevents warping. "With our tooling, the press forms the part, then maintains force on the metal for an extended period," says Bruce. "The ability to form and fixture-quench the part at the same time has eliminated three steps from our production cycle."

The fabricator runs material 0.083 in. to 0.312 in. thick and has the flexibility to adjust press speed and tonnage. The working speed of the press was tailored to accommodate different-size parts, some of which do not require full tonnage.

"Traditionally, we provide two extension speeds," says Harrelson. "To approach the part quickly to maximize production, we offer a fast approach speed. Once the part is reached, a pressing speed is activated, resulting in maximum available tonnage for the working portion of the cycle. To better suit Osmundson's specific requirements, we designed multiple valve configurations, which provide three different pressing speeds and programmable tonnage control. While large parts are formed at approximately 100 [in. per minute], parts requiring less tonnage can be formed at faster speeds with a maximum capability of more than 600 ipm. The modification helped Osmundson improve cycle times for a large percentage of its parts."

The machine's dual-ram configuration helps the fabricator shave minutes off its operation in other ways. "Built into one frame, the dual-ram design allows the operator to load one side and start the



A high-quality coulters blade.

production cycle. While the first part is processing, the operator can load the second part. Once the second part is loaded, production of the first part is complete, allowing the operator to reload.

"The size and configuration of the press requires less steps and less motion from the operators," says Bruce. "The machine's small size means an operator doesn't have to reach very far to run both sides of the press." In addition to improving production efficiencies, Bruce says the five-post, dual-ram press replaced two individual presses, saving valuable floor space. "It's been a nice upswing for us," he adds.

Faster setups also contribute to overall time savings. The press is equipped with a Beckwood Productivity Package Control System with an HMI touch screen. The feature allows the operator to program cycle parameters quickly and store recipes to the PLC for future use.

For Osmundson, the investment in a new press has produced efficiencies that position the company to better respond to the needs of a marketplace where food demand is on the rise and farming techniques continue to grow more complex. "The U.S. still has the best soil and rain conditions in the world for growing food that can be used globally," says Bruce. "Equipment like the five-post, dual-ram press combined with our innovative manufacturing designs and processes helps us continue to provide farmers with high test quality, ground-engaging equipment that is made in America." **FFJ**



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