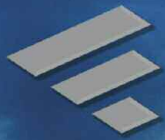


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Helps Aerospace Supplier Fly High

A new triple-action press enables Weldmac to form difficult high-temperature materials and increase capacity as orders soar.

BY LOUIS A. KREN, SENIOR EDITOR

From a manufacturer's perspective, automotive and aerospace, despite their proximity in the dictionary, couldn't be more different. Where "low" part volumes in automotive can number in the tens of thousands, in aerospace these numbers exceed what's required for even the largest part runs. Automotive stamping presses form various grades of steel and aluminum alloys as well as more exotic materials used in electronic and exhaust systems. But aerospace takes exotic one level further with titanium, Inconel and Hastelloy alloys as frequent part ingredients, making aerospace component manufacturing one of the most challenging metalforming applications.

In its 51st year, Weldmac Manufacturing Co., El Cajon, CA, knows well what makes aerospace supply so unique and has taken the steps necessary for success in that sector.

"I started the company in 1968, welding and machining in a 2000-sq.-ft. space," recalls Marshall Rugg, Weldmac president and CEO. "One small company with a lot of competition."

Capability Increase Limits Competition

To distinguish itself from the tooling crowd, the company first added sheetmetal fabrication capabilities such as press-brake forming. Over the years, Weldmac has brought more sheetmetal-processing equipment inhouse, including presses, laser cutters and spin machines, while also building its assembly capabilities. Today, the 150-employee job shop occupies 100,000 sq. ft., with two satellite buildings providing 30,000 more.

"We've had a great deal of success in supplying turbine-engine components such as combustion liners and housings as well as detailed parts for aerospace



customers," Rugg says, explaining the company's product mix.

Aerospace Uptick Justifies New Press

Weldmac recently added a six-axis fiber laser as well as new welding and machining equipment. Its latest shop-floor resident: an 800-ton triple-action hydraulic press from Beckwood Press Co., St. Louis, MO. The new press increases Weldmac's capacity and supports its existing 150- and 450-ton triple-action presses.

"We've considered bringing in a press of this size for a few years, but business conditions did not support it," Rugg says, noting that military and

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commercial aerospace orders have picked up recently after a lull earlier this decade.

The new custom press, installed over the summer, is the second Beckwood machine in Weldmac's arsenal. The first, a 5000-psi sheet-hydroforming press, was delivered in January 2016. Given the frequent tool changes required in a job-shop setting, sheet-hydroforming technology is an ideal

choice for Weldmac because it doesn't require mated tooling or secondary finishing, yet it yields complex net-shape parts with smooth, scratch-free surfaces.

"Parts seem to be getting bigger and bigger, as does the tooling," Rugg says. "Parts began exceeding our capacity in tonnage and size. We have the machining capability to build large tools and are adding machining equip-

ment to do more. We need the size and tonnage that this press provides."

With a large 6 by 7-ft. forming area, the new triple-action press doubles Weldmac's overall capacity and tonnage capability. Due to the complex part geometries and frequent off-center loading, Beckwood engineered a gib-guided press not only to accommodate Weldmac's existing part family, but also to support future growth with larger parts.

Press Programmability New for Weldmac

A PLC, absent on Weldmac's existing triple-action presses, allows for a consistent and repeatable process.

"This press runs in semi-automatic mode and is programmable via the PLC," says Caleb Dixon, Beckwood sales engineer. "By implementing a standardized controls system, operators simply can enter a job number, push the 'start-cycle' button and begin producing consistent, repeatable parts in a matter of minutes—vastly reducing the learning curve when compared to a manual press system. Upgrading to programmable controls is a great long-term solution for Weldmac because it reduces the company's reliance on skilled operators and enhances part quality."

"We look forward to going from manual to programmable presses," Rugg adds. "At double the tonnage of our other triple-action presses and with a larger bed size, we've already increased capabilities by 50 percent. Ease of use due to programmability should push capabilities to a 60- or 70-percent increase. Operator capability enters into it, but the controls on this press will make jobs easier for a good manual-press operator."

Triple-Action Technology a Perfect Fit

Similar to Weldmac's existing triple-action presses, the new machine forms a variety of high-temperature alloys. Forming difficulties inherent in these materials make a triple-action press an excellent choice, according to Dixon,



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who explained the workings of this technology.

“The triple-action press consists of a punch or forming tool on the main draw ram, a clamp ram in the middle, and a knockout cylinder and/or bed cushion on the bottom,” he says. “The clamp ram contacts the blank and is engaged throughout the forming process to control material flow, reducing the risk of wrinkles or tears within

the part. By giving operators the ability control material flow, they will achieve greater success in forming parts.”

The clamp ram also features individual tonnage control on each cylinder.

“If operators want one corner of a sheet to flow inward more rapidly, they can reduce tonnage on that cylinder, while increasing tonnage on the other side to provide more holding force,” says Dixon.



Weldmac's new press joins this 5000-psi sheet-hydroforming press, installed in early 2016, which doesn't require mated tooling or secondary finishing, yet yields complex, net-shaped parts.

Unique to all Beckwood triple-action presses is the ability of the lower ram to serve either as a knockout for part ejection or as a cushion, depending on tooling requirements. “Proportional control valves regulate the bed cushion, enabling dynamic control through four different travel zones,” Dixon explains. “Through the press’ HMI and recipe settings, the operator can specify a desired bed cushion force at any position within each zone.”

Handles Parts Large and Small

In addition to large-part capability, Beckwood designed the press with added versatility to handle smaller parts on jobs off-loaded from some of Weldmac’s older presses. The main ram offers capacity from 80 to 800 tons, with the clamp-ram bolster providing 10 to 300-ton capacity.

The new press will help Weldmac handle an uptick in exhaust components produced for commercial stationary turbine engines as well as its thriving aerospace-supply business. It also brings more to the table.

“We excel at building complex components and assemblies,” says Rugg, “and that work continues to increase. We’ve added customers that usually come to us with one problematic part or assembly, and that leads to more business. When we do a good job, a new customer looks to give us more things to do. New press capacity and capability helps us handle that.” **MF**

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