

Servo-Driven press Quartet

Brings Flexibility to Stamper

Metal stamper Ward Manufacturing Co. invests in its future by installing a lineup of servo-driven gap-frame presses.

BY BRAD F. KUVIN, EDITOR

When a new contract with a U.S. heavy-equipment manufacturer presented metal stamper Ward Manufacturing Co., Evanston, IL, with a production puzzle, the family-owned business turned to servo-driven mechanical-press technology to solve it.

"The job required us to produce 14 different parts from different materials in four operations," says company vice president Tom Ward, "but die sizes and heights were unknown variables. We were asked to specify equipment when we didn't know all of the job parameters."

Ward ultimately invested in a line of ServoPro presses from Aida-America Corp., Dayton, OH. He quickly found that the ability to program the presses with any number of stroke, velocity and dwell profiles eliminated guesswork by giving the firm the flexibility it needed. Servo technology also allowed the manufacturer to meet another important objective.

"We could have considered a conventional press line for this job," says Ward, "but the manufacturing cell we created by selecting a transfer line of four servo-

driven 250-ton gap presses allowed us to invest in our future—a goal that is central to our business strategy."

It's that kind of forward thinking that has allowed Ward to achieve 68 years of steady, debt-free growth, specializing in complex progressive-die work and a broad range of high-volume drawn metal stampings with tight tolerance requirements. The stamper primarily serves first, second- and third-tier suppliers to the automotive, heavy-duty truck, construction, electrical, aerospace and appliance industries.

Manufacturing-Focused

In 1995, Ward built a 35,000-sq.-ft. manufacturing facility. In 2004, the firm moved its shipping, receiving and finished goods into a separate 27,000-sq.-ft. warehouse, which allowed Ward to expand its manufacturing capacity. Its ability to process kanban shipments mean customers enjoy a continuous supply of parts while carrying low inventory exposure. In addition to a 100-percent on-time delivery rate and, at times, amortization of tooling costs, Ward's critical support network delivers

a menu of secondary operations as well as short-run stampings, metal fabrication and high-tonnage parts production.

"We produce and manage work volumes from a few hundred to more than 80 million parts per year," says Ward. "Because we've built a one-stop-shop infrastructure, our customers can track and coordinate purchase orders through just one vendor instead of many different suppliers."

With its Aida ServoPro gap-press line, Ward has added a new level of service by helping its customers enhance their own design capabilities. "With this technology we can allow our customers to engineer stampings and assemblies that could not readily be manufactured in traditional stamping presses," says Ward. "It also allows us to form more complicated geometries and produce draws in exotic materials at higher speeds while maintaining dimensional integrity—something that, prior to this technology—was, at best, difficult."

Ward installed the servo-press line in December 2004 to produce components for off-road equipment. The line also produces light bar parts for the



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emergency markets and heavy-gauge, high-volume shaft-seal components requiring a tight-tolerance draw process. The press line stamps 0.090-in.-thick 1074 spheroidized annealed spring steel, stainless steel and draw-quality cold-rolled steel. It runs one shift, five to six days per week depending upon customer requirements.

Multiple Hits in One Cycle

“Working with high-strength materials can be challenging,” says Ward, “because to a certain degree, during forming the material tends to spring back to its original shape.” Historically, standard forming methods called for as many as three different hits to form a part. This meant stopping the press to make each hit, with final processing requiring secondary operations that could result in over-bending of the part.

With the ServoPro gap presses, Ward says that the company has learned something new. “We found that instead

of applying a high tonnage to produce parts with tough bend requirements, we only needed to modify the stroke profile to hold pressure at the bottom of the stroke, release the pressure and then re-apply it. ServoPro allows us to make multiple hits in just one cycle, set the form and eliminate the need for secondary operations,” he says. “The result is a more accurate and complete part.”

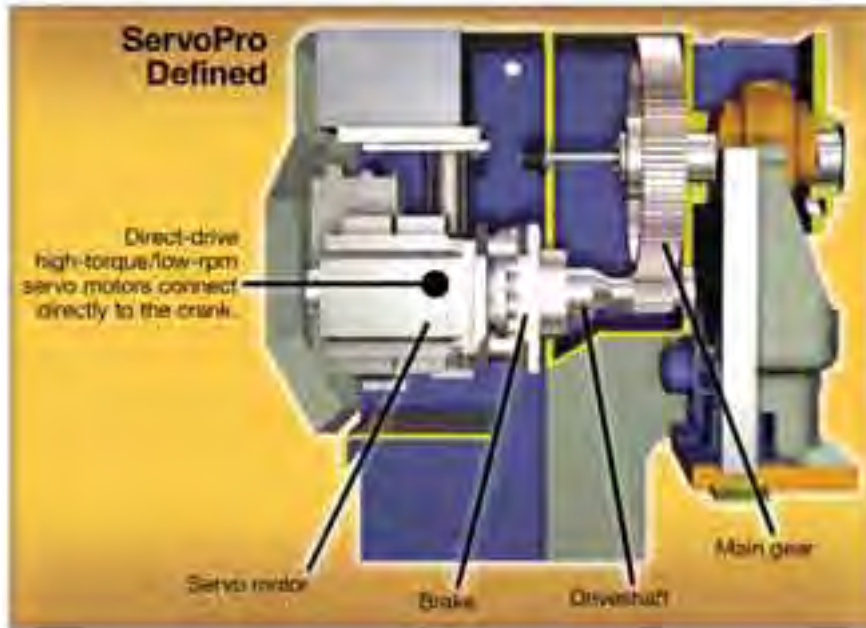
The stamper also has found its new press line to be an effective solution for combating the effects of reverse tonnage. Previously, Ward ran a blanking operation using high-carbon material on a 600-ton straightside press. This process generated high reverse-tonnage loads that caused the press to experience serious maintenance issues—a typical side effect of blanking hard materials.

“Because of ServoPro’s silent blanking motion, we found that we could run the same job on a much smaller press without negative impact to the equipment,” Ward says. “We’ve dedicated the

first gap press in the line for blanking. By changing the crank profile and slowing the ram velocity at point of impact, we were able to decrease overall tonnage requirements by 20 percent and reverse-tonnage loads by 30 percent, dramatically reducing die and press wear.”

Traditionally, stampers have worked to offset the effects of reverse tonnage by following a fundamental calculation: Double the amount of press tonnage required to produce a part. “The servo-drive technology allows us to load 220 tons of blanking force on a 250-ton C-frame gap press without hurting the machine,” Ward says. “This means that we can operate the press much closer to its rated capacity by controlling slide velocity and dramatically reducing reverse tonnage.” In its blanking operation, Ward now sets minimum stroke length to match the work, allowing a shorter working cycle time. The blanking mode is designed to significantly reduce shock, vibration and noise.

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Layout Efficiencies Gained, Too

With its new four-press lineup, Ward also has gained efficiencies in press layout. Parts transferred from press to press by a mechanical conveyor setup need only move 8 ft. rather than across Ward's pressroom floor. As a result, costs associated with additional time and packaging requirements are reduced. "We've experienced a dramatic increase in productivity with this press-to-press transfer in comparison to

our standard method of manufacturing," Ward says.

And, looking toward the future, the ServoPro controls allow for quick interface with a robotic transfer mechanism, giving Ward the option to automate the line and further increase its flexibility. "Installation of a robotic transfer mechanism could turn this line into an 1100-ton transfer-press line," Ward says. "We are actively looking for projects that could benefit from servo-press technology, and feel that robotic-trans-

fer technology could improve our competitive advantage even more."

The servo-driven presses also offer hand-crank motion, which allows the operator to manually progress through the slide motion—extremely beneficial during tool setting.

"When our operators set up dies, hand-crank motion allows them to precisely pinpoint when the pilot enters, when the blank through occurs, when the draw occurs and when the pilot clears the stock strip," Ward says. "The dial can be turned quickly for rapid movement or very slowly for pinpoint timing evaluation. ServoPro allows these operations to take place under full tonnage capacity of the press. The hand-crank feature makes synchronization of feed timing, die protection and stroke profile simple and quick, dramatically decreasing our setup time and increasing part accuracy."

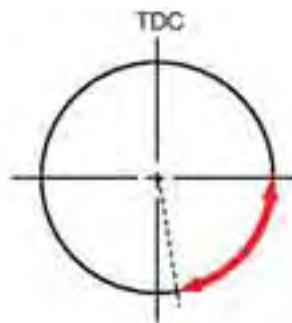
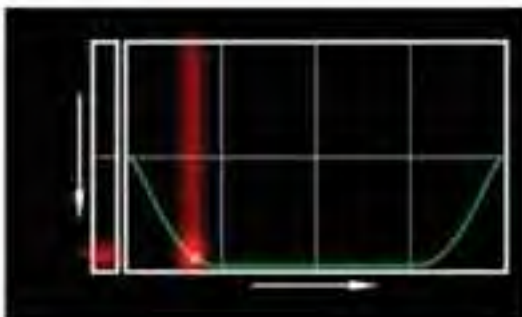
A Step Up in Sophistication

Since installing the servo-press line, Ward's personnel have gained more than just production advantages. "ServoPro technology has helped us become more sophisticated in our knowledge of stamping by giving our employees deeper insight into the science of material formability and the process by which you shape sheetmetal into a final part," Ward says. "We've gained a better understanding of how metal alloys are formed, how they break when stamped, the way they spring back and the impact of these parameters on the equipment."

Ward is looking to expand production by actively pursuing nontraditional work to further test the capabilities of its new press line. "With ServoPro we no longer have to worry about how we'll adapt to jobs that haven't come in the door yet," Ward concludes. "In addition to flexibility, the gap-press line has given additional press capacity and helped us secure new business. The efficiencies we've gained coupled with the advances of this technology give us a competitive advantage and provide us with a powerful tool to compete and win against global low-cost sourcing."

MF

Motion for Combined Working Slide Not Passing Bottom Dead Center



- Since the slide does not pass bottom dead center, die sticking does not occur and combined working becomes possible.
- Combination works such as tapping within the die and mounting of other parts become easier.
- Combination with linear scale makes bottom-dead-center compensation possible.
- By fitting a linear scale option to the slide, more precise bottom-dead-center position control becomes possible.