

# Steel story

Growing use of newer high-strength steels could mean changes for the press industry

“**A** change is gonna come...” Sam Cooke’s haunting lyrics from 1964 could be a rallying cry—or a song of lament—depending on one’s perspective. From the impact of the Affordable Care Act on major on major medical plans to Microsoft’s announcement it will no longer provide service and support for Windows XP, change could be considered the year’s new watchword. A growing trend in the metal-forming industry also could mark a significant change for fabricators. A ramp-up in sales for mechanical direct-drive servoformers may signal eventual obsolescence for the standard mechanical press, says Bob Southwell, vice president of sales and marketing for Aida-America.

Aida’s Dayton, Ohio, manufacturing facility is the North American headquarters for the global company, which designs, manufactures, services and supports a full range of servo-driven mechanical presses from 80 tons to 3,000 tons; mechanical stamping presses, from 35 tons to 4,000 tons; and metalforming automation equipment.

The steady migration toward servoforming is part of a ripple effect created by a growing use of newer high-strength steels. When it comes to strength-to-weight ratio properties, these materials are a step above garden variety high-strength low alloy steels, says Aida product manager Shrini Patil. “HSLA steels have been used in North America for more than a decade,” he says. “In the last five to six years we’ve seen greater numbers of customers turning

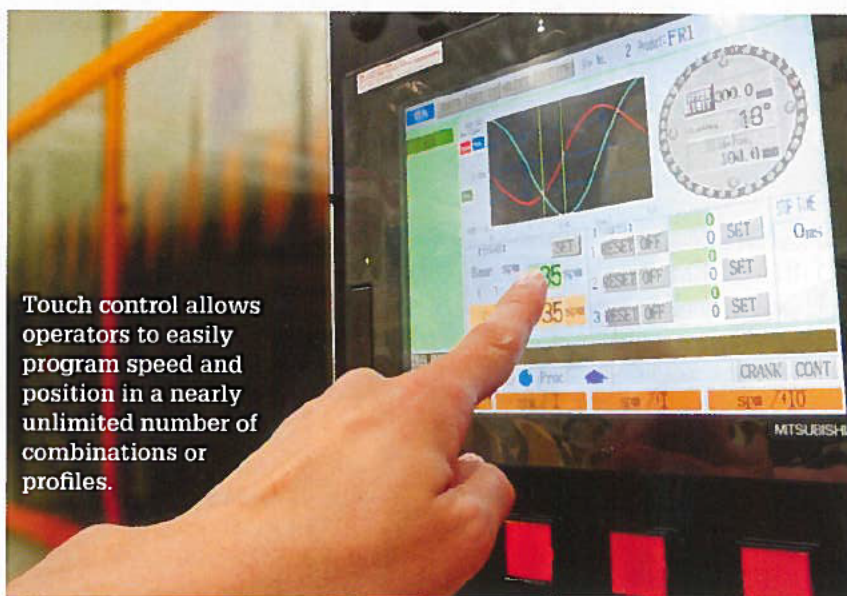
to high-strength steel, advanced high-strength steel and ultra high-strength steel to make parts. Compared to HSLA steel, which has a 300 to 600 MPa yield strength, the yield strength for advanced high strength steels is 600 MPa or higher. Fabricators can reduce part weight even further without sacrificing performance properties. Forming however is much harder because the higher the material’s strength the lower the forming speed.”

Slow forming speeds make producing precision parts from high-strength steels in a conventional mechanical press next to impossible because they typically run at a constant number of strokes per minute (spm). “You need the programmability of a servo slide motion to achieve consistent, precision forming on a part-to-part basis,” Patil says. “Our DSF series direct-drive servoformer allows operators to program speed and position in a nearly unlimited number of combinations or profiles. This means a fabricator can run the servoformer at a speed as low as 1 spm during actual forming then return to full speed for the nonworking portion of the ram cycle to maintain overall productivity levels. If you were to try to run a standard mechanical press at these low spms, the machine wouldn’t be able to generate enough energy to form the part. High-strength steels also have very high springback characteristics. Servoforming minimizes springback because the press can be programmed for multiple restrikes at bottom dead center. In transfer applications that require high-strength material, servoforming can be used to optimize pro-



This Aida 630 ton DSF-M2-6300 straightside servo press is able to form higher strength steels at very low spms yet its direct-drive construction provides the same tonnage rating point and through-the-stroke torque capacity as a conventional mechanical press.





Touch control allows operators to easily program speed and position in a nearly unlimited number of combinations or profiles.

cessing time for higher productivity levels.”

These newer steels also carry a higher level of variances making it difficult for fabricators to produce consistent parts especially when switching from one coil to another. “The servoformer’s programmability can virtually eliminate these material variances,” Patil says.

Aida first introduced servoforming to the North American metalworking industry in 2001. A new concept for most fabricators, the technology experienced a slow start. Today the manufacturer is seeing a significant uptick in machine sales. “At the height of the downturn our servoformer presses represented just 5 percent of Aida’s sales,” says Southwell. “Today, our servoformers make up 50 percent of our sales.” Aida primarily is seeing demand for the machines in the automotive and appliance markets with a smaller percentage of servoformer sales in the aerospace and medical device markets.

“During the recession, capacity dropped dramatically for automotive and appliance OEMs and Tier 1 and Tier 2 suppliers,” he says. “The upturn we’ve seen since 2010 is being driven by a couple of factors. First, suppliers that survived have taken on more work and exceeded capacity. They are looking for capital equipment that can help them add capacity to keep up with customer demand, particularly in the automotive arena where sales continue to be brisk. Second, the Corporate Average Fuel Economy standards released in 2012 require automakers to raise the average fuel efficiency of new cars and trucks to 54.5 miles per gallon by 2025. In turn, suppliers

are expanding their use of high-strength steels and aluminum to make lighter weight components, but that means investing in a machine that can form these materials.”

Early adopters of servoformer technology are experiencing success, says Southwell, and OEMs and suppliers that have been on the fence are taking notice. One supplier producing a ring spring part with an OD of 190 mm for transmissions on a standard mechanical press transitioned the part project to an Aida direct-drive servoformer. Running the servoformer at 59 spm with a 30 percent slowdown at 5 mm above bottom dead center resulted in a 250 percent increase in die life and a 130 percent increase in productivity. In addition to shortening die life and hindering production, hard-to-form materials also can contribute to conditions like reverse tonnage in a mechanical press. The servoformer’s programmability can significantly reduce reverse tonnage by allowing the operator to slow the press down and reduce the press stroke.

Another manufacturer making 6 in. by 4 in. high-strength steel automotive brackets was experiencing reverse tonnage of 120 t in a 1,200-ton mechanical press with shock dampers at 35 spm. The supplier moved part production to an 800-ton direct-drive servoformer without shock dampers at 40 spm and reduced reverse tonnage to 20 t.

The servoformer’s programmability also is helping entrench the machine in the appliance industry. “For decades appliances consisted of a simple box-type construction,” says Southwell. “Today ap-

# Mechanical Presses

pliances are viewed as accessories. Customers are demanding more elegant designs in hard-to-form materials like stainless steel. To fabricate these complex 3-D shapes, OEMs have to look at non-traditional technology like servo presses."

The technology is making inroads with medical device manufacturers and aerospace suppliers. One aerospace manufacturer reduced its scrap rate from 20 percent to less than 1 percent while increasing production from 90 spm to 120 spm.

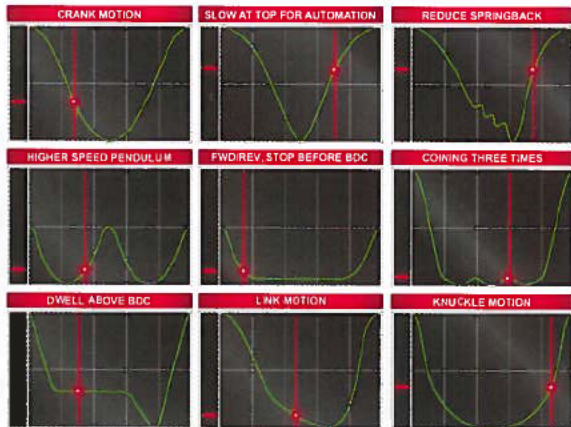
Southwell says the secret is application engineering support and training to help customers develop programming profiles specific to their applications. "There is a learning curve with this technology," he says. "If you try to operate a servoformer the way you've run your standard mechanical presses, you won't see much difference in part quality and production rates."

Southwell says training also is about changing the way customers think about forming. "Fabricators, especially contract stampers, have to fully commit to em-

**Operators can choose the stroke length that fits the part being formed with the DSF Series direct-drive servoformer's programmable slide stroke and motion.**

bracing servoforming from management to floor personnel. Engineering design specialists and sales also have to adopt the mindset in order to recognize future opportunities that can fill their pipeline."

While there are some applications that don't require servoforming, the need to reduce weight, improve performance, produce complex designs for new product development and support other demanding applications continues to encourage a wider use of high-strength materials. "Customers are being pushed by both OEMs and their competitors to



look at and invest in servoforming," says Southwell. "Those that don't may not be in business five to 10 years from now. We project that over the next three years our servoformers will make up 80 percent of our sales. We expect that standard mechanical presses will take an increasingly smaller share of the market as more fabricators employ servoforming to meet customer requirements."

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