Better Control, Better Flexibility

Government requirements trickle down to the press room, creating ever-more-challenging end-user demands.

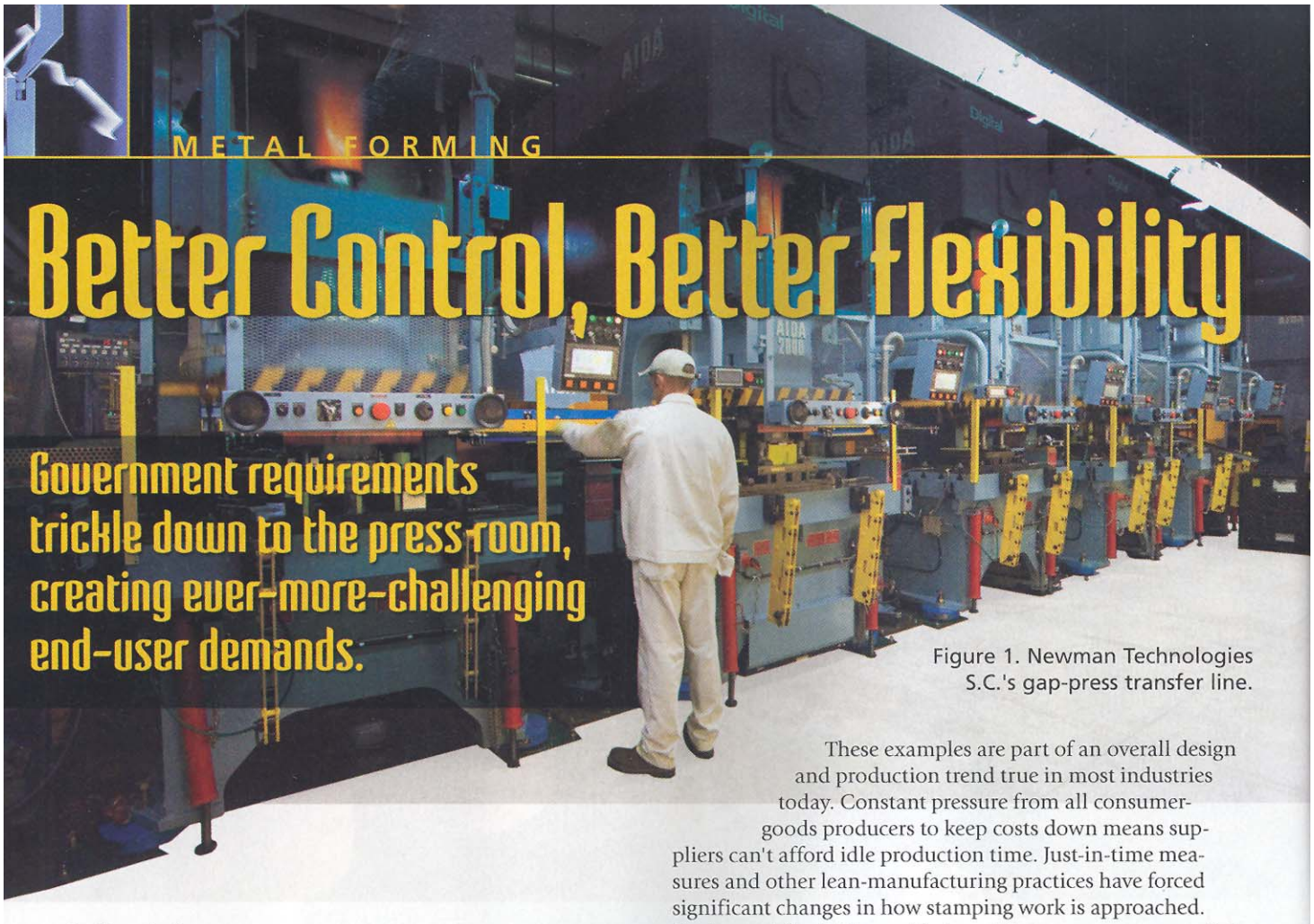

Figure 1. Newman Technologies S.C.'s gap-press transfer line.

By Dennis Boerger

In a shrinking market, North American stampers continue to grapple with a global economy, massive increases in steel prices and stiff competition. Surprisingly, these factors are only part of the story relating to the push for new product designs and sheet-metal forming capabilities. Changes in the stamping industry over the past decade can be tied heavily to the demands of end users—demands that have also dictated the need for different materials and advances in production equipment.

Automotive manufacturers are responding to government requirements to reduce engine emissions, improve fuel efficiency and offset high commodity prices with parts that are lighter yet stronger. To accomplish this, automakers are choosing high-tensile steel and aluminum over heavier materials. The unique forming characteristics of these materials have in turn prompted changes in presses and other related production equipment.

The need for greater efficiency has tapped the HVAC industry as well. For instance, recent government specifications for appliances with higher energy-savings ratings have forced design changes in air-conditioning and furnace units. Product configurations have undergone further changes as ratings have become more restrictive. Many of the new designs can't be produced on existing production equipment.

These examples are part of an overall design and production trend true in most industries today. Constant pressure from all consumer-goods producers to keep costs down means suppliers can't afford idle production time. Just-in-time measures and other lean-manufacturing practices have forced significant changes in how stamping work is approached. Equipment flexibility and fast part changeovers are essential. Historically, suppliers to the automotive industry might shut down for as long as two weeks during a model changeover. Today, part changes must be accomplished in a matter of minutes, not days or weeks.

MORE CONTROL, MORE ACCURACY

Stampers' need for increased flexibility and uptime has paved the way for the introduction of a significant change in press operation. Able to produce a wide range of parts from materials like aluminum, magnesium, high-strength steel and titanium, the technology provides control of slide position, within microns, something that can't be done on hydraulic or conventional press equipment.

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Built with the original direct drive design, ServoPro houses a high-torque, low-rpm servo motor that permits higher speeds, higher working energy, better control and precise accuracy. The motor also eliminates the need for complex torque-amplification mechanisms required by off-the-shelf high-rpm, low-torque servo motors. Power consumption is reduced and less maintenance required. Direct drive provides the same maximum stroke length and torque rating as a conventional mechanical press while allowing the full torque to be used down to five strokes per minute. Full torque at very low speeds gives stampers the

ability to perform forming operations at slide velocities that cannot be achieved with conventional press drives.

TRIMMING DOWN LEAN

One first-tier supplier to the ATV and automotive industries, Newman Technologies S.C., found it could trim its already lean-manufacturing practices even further by replacing costly progressive-die operations with a gap-press transfer line equipped with the technology. One progressive die with five stations was replaced with five single dies, making repairs very quick (Figure 1).

The Aiken, S.C.-based manufacturer produces a variety of exhaust system, muffler, door-sash, luggage-rack and swing-arm parts. In addition to a range of stampings, Newman provides the capability to weld to assemblies and distributes directly to its customers. It is one of two divisions under its parent company Sankei Giken Kogyo Co., Ltd., headquartered in Japan.

The servo-driven transfer line, with five AIDA NC1 single-point 200-ton gap presses, is connected by the press builder's A-8 Inter-Press Transfer Robot to provide automation. The line produces seven part numbers for cover and bracket applications using carbon steels and stainless steel ranging from 0.3 to 1 mm thick (Figure 2). Its flexibility allows Newman to manufacture a mixture of individual components and part families in low-volume batches requiring quick changeovers (Figure 3).

Running different operations presented another challenge. Die sizes are not always the same, and some operations take longer than others. The servoforming technology's ability to customize the slide motion and stroke length of each gap

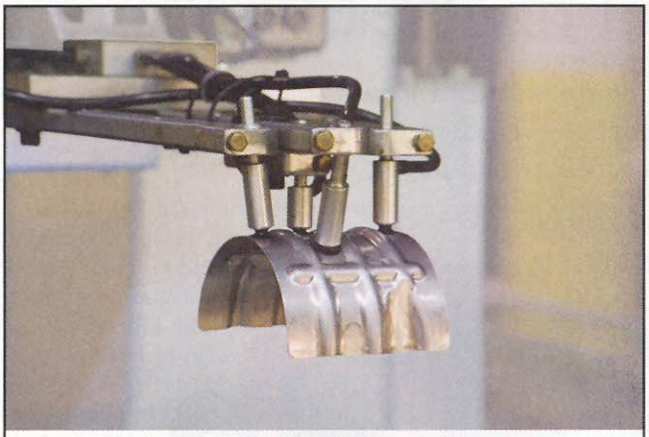

Figure 2. The gap-transfer line is used for cover and bracket applications.

press made it possible to set the stroke to match die complexity and adjust the speed as needed. The supplier was able to improve part quality and shorten lead time. Die maintenance costs also improved by as much as 25 percent.

The servo-driven gap-transfer line performs five different operations, from sizing, blanking and through-hole punching to forming and shaping with die cushions. All five presses can be used or as few as one. The line's flexibility, when compared to a conventional line, reduces scrap rates by up to 50 percent. The servo-driven multi-press transfer line can also be run in continuous mode, delivering higher productivity rates than operations running in single-stroke mode.

Figure 3. With the gap-transfer line, instead of one progressive die with five stations, Newman is able to use five single dies.

Time is also gained during tool-setting activities with hand-crank motion, an operation that can be performed under full tonnage capacity of the press. During die setup, the hand crank allows the operator to manually progress through the slide motion, precisely pinpointing when pilots enter, when blank-through occurs, when the draw occurs and when pilots clear the stock strip.

The dial can be turned as slow or fast as the operator needs for isolated timing evaluation or rapid movement. Synchronization of feed timing, die protection and stroke profile can be set quickly. Part accuracy increases, and setup time is dramatically reduced.

EMBRACING CHANGE

In addition to new materials and advances in press technology, another demand has emerged in recent years: a new kind of partnership between stampers and their suppliers. At one time, many stampers staffed experts with the ability to analyze and identify equipment needs. But over the past couple of decades lean-manufacturing practices have all but eliminated that type of dedicated internal support. As press designs and capabilities continue to evolve, stampers will find it more difficult to maintain an understanding of the increasing number of variables affecting the design and layout of the types of manufacturing cells needed to produce newer product designs. To fill a need, new partnerships have developed between stampers and suppliers that help manufacturers consider all alternatives and, at times, avoid costly capital-equipment mistakes.

The metal-forming arena will continue to see end-user demands for new product configurations, materials and press capabilities. Press builders will need to actively work to develop new designs or technologies that will enable stampers to take full advantage of new materials that are difficult to form. For both stampers and press builders, the ability to adapt and embrace change will be essential to bottom-line profitability and growth.

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