JANUARY 2009

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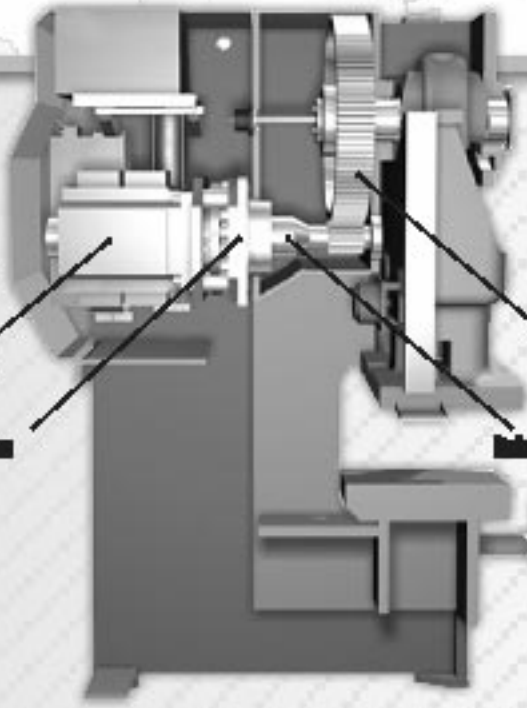

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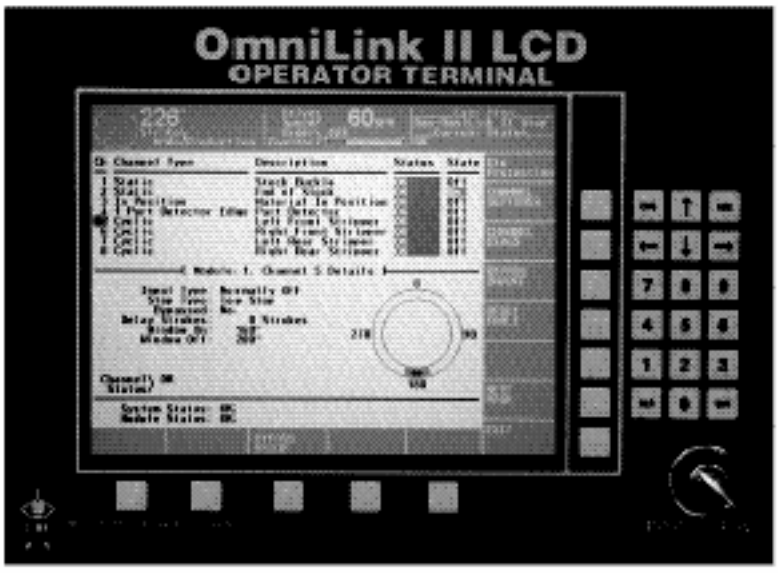

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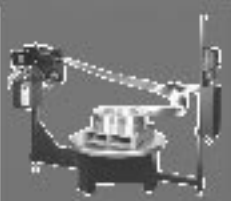
Servo Feeds

Straighteners



Pallet Decoilers

Low Loop Controls

Stock Reels

Cutters

MetalForming

Serving those who create precision metal products using stamping, fabricating and other value-added processes.

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Robotic blank handling—from stack through lubrication and on to a hydraulic press—improves line speed by 25 percent. A double end-of-arm tool simultaneously removes a scrap ring and loads a new blank, with safety ensured as hands no longer enter the press.

18 **Top 10 Reasons to Go Hydraulic**
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Record-setting attendance and exhibitor counts set an overwhelming stage at the technology-laden EuroBlech 2008 exhibition, October 21-25, 2008, in Hanover, Germany.

Tooling Technology

38 **Gas-Spring Octet Connected Without Hoses or Fittings**
A predrilled base plate allows connection of eight nitrogen-gas springs without using hoses or fittings. The setup, for predrawing automotive spring seats, also allows the stamper to adjust gas pressure during setup and production to optimize quality.

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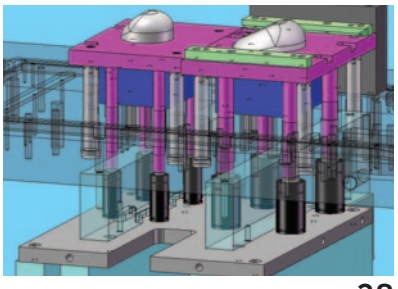

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ABOUT THE COVER: A new forming line at the York, PA, facility of GEA PHE Systems employs unique hydraulic-press technology in the production of heat exchangers—many small cylinders instead of one large one. The smaller cylinders fill faster and require substantially less compressible oil. The technology has resulted in faster cycle time, higher output and precise forming of the heat-exchanger plates. Read all about it beginning on page 20.

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Contents

The Issue in Quotes

"Robotic blank handling represents a big step in increasing direct shipping from 10 percent of our business to 50 percent. We've been able to increase the production rate to 4 strokes/min., a 25 percent gain."

—Todd Weston, Amtrol Inc., page 14

"Our welds look like they were performed by a robot, but are better because they are so flawless."

Mike Young, Big Gun Exhaust, page 24

"Valves (for the eight-gas-spring setup) right in front on the bottom carrier plate of the die are easily accessed by the press operator or die setter to provide the level of control required by our customer."

Ron Barnes, Performance Tool & Die, page 38

Don't Miss Any More *Tool & Die Authority*

The December issue of T*ool & Die Authority,* *MetalForming* magazine's premium e-newsletter, was packed full of useful info. If you're not signed up, here's what you missed:

- Proactive error-proofing via proper setups;
- Time-saving alternatives for the toolroom;
- Failure analysis for stamping dies, focusing on tool-steel heattreatment;
- And much more.

Don't miss any more issues of *Tool & Die Authority*. Find out more and sign up at metalformingmagazine.com/toolanddie.

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Feed Rate (feet/minute)	12 - 35	15 - 40	15 - 40	15 - 40
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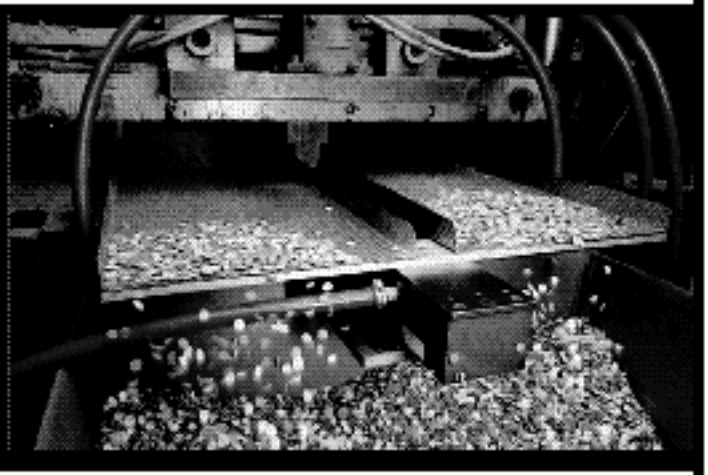
Maximum Load	25 lbs.	60 lbs.	125 lbs.	500+ lbs.
Max. Weight of Tray	5 lbs.	25 lbs.	60 lbs.	100 lbs.
Transparent Weight	2 lbs.	13 lbs.	30 lbs.	47 lbs.



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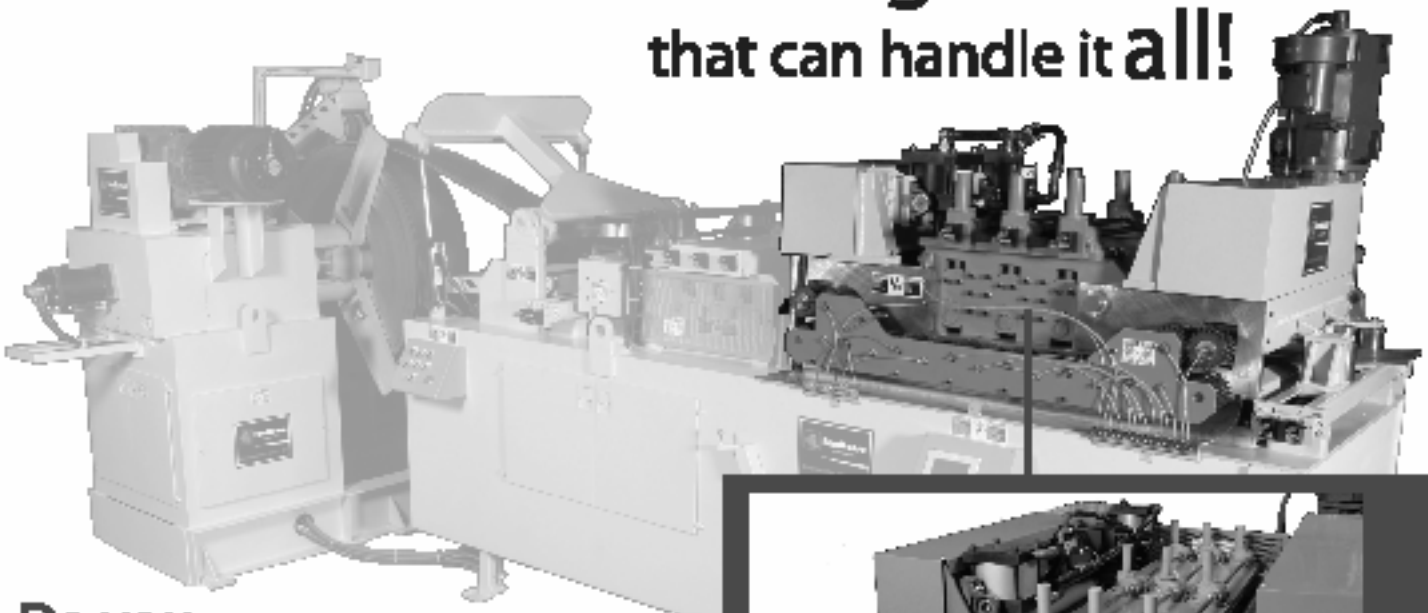

Do you ...

- Want to run thick material (.250 - .500"+)?
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- Not want to use a pull through straightener?
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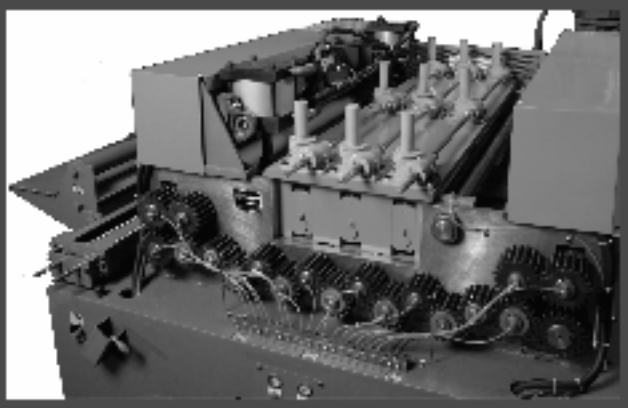

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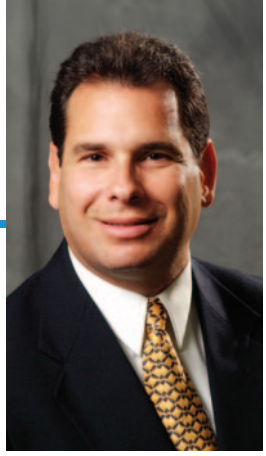
"For metalforming companies, the biggest opportunity for new business to help fuel wind-power expansion is the turbine nacelle."



EDITORIAL BRAD F. KUVIN

The Answer is Blowing in the Wind

A sold-out technical conference with a standing-room crowd, in this day in age, is a beautiful thing, and that's exactly what I witnessed last month. More than 800 people representing metal-parts suppliers, economic-development groups and other organizations hoarded into a day-long supply-chain workshop on December 9, and another 250 were stuck on the waiting list. Attendees learned of a severe bottleneck in several areas of the metal-parts supply chain for an industry where new capacity is a must to support what was referred to as "the fastest-growing industry in North America."

What is this market, you ask? It's wind energy, which I touched on in last issue's editorial page. When I attended the Wind Power Supply Chain Workshop in Cleveland a few weeks ago, I experienced first hand the unreal excitement surrounding the supply-chain development going on to support the fast-growing wind industry. Demand in the United States for wind-turbine components and assembly is ahead of supply, and opportunities abound for manufacturers willing to invest in and adapt their operations.

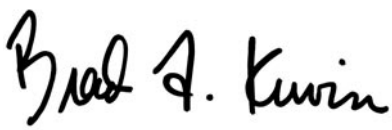
The United States has been the single largest market for wind energy since 2005, and experts foresee that expansion continuing for years to come. The industry shattered production records in 2007, and in 2008 the U.S. wind-energy market welcomed 4500 new turbines. And since each turbine features more than 8000 components, the overwhelming majority of them steel, the parts-supply chain has a lot of growing to do in order to keep pace. We're talking sheetmetal fabrications, castings, machined parts, bearings, gears, forged components and fasteners. The biggest bottleneck, we were told at the workshop: generator components.

For metalforming companies, the prime opportunity for new business to help fuel wind-power expansion is the turbine nacelle—the assembly that includes the generator as well as the gearbox, radiator, yaw motor and bearing, mechanical brake and other components. Other supply opportunities include the fluid systems used for lubrication, cooling and hydraulic power; and the electronic control systems for the generator and power electronics.

The carrot pacing the wind industry's quickening pace is the U.S. Department of Energy's technical report, 20 Percent Wind Energy by 2030. To get there, the American Wind Energy Association (AWEA) projects the need for 200,000 new wind turbines—that's 200,000 gearboxes, generators, etc., as well as a healthy aftermarket support system for the manufacture of replacement parts. Several new turbine-assembly plants are popping up in Pennsylvania, Iowa, Texas, Montana, Idaho and Colorado. And just last month I received press releases announcing two huge proposed projects, the biggest being a request for proposal from the Tennessee Valley Authority to supply as much as 2000 megawatts of power generation from renewable and clean energy sources by 2011. For perspective, consider that the average wind turbine produces 1 to 3 megawatts of power.

Amongst the 400 or so companies represented at the December 9 workshop, sponsored by AWEA, several came from the metalforming industry. If you've got excess capacity and the wherewithal to retool somewhat to meet the specific demands of this industry, then spread your wings and take flight with the wind. Start by checking in at the AWEA website, www.awea.org, where you can download several of the presentations from the Cleveland supply-chain workshop. Among them are four papers under the heading, Major Component Sourcing & Value Chain Services; and three talks under the heading, Entering the Wind Industry: Funding, Contracts and Re-Tooling. The link to the presentations: www.awea.org/events/supplychain2/presentations2.html

Here's to a happy and healthy New Year for you, your families and your companies. I wish you well.



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bkuvin@pma.org

MetalForming

Serving those who create precision metal products using stamping, fabricating and other value-added processes.

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NewsFronts

Associations

IISI Changes Name to World Steel Association

The International Iron and Steel Institute (IISI) announced that it has changed its name to World Steel Association (worldsteel). The name change is effective immediately.

Speaking at the steel industry annual conference, Director General Ian Christmas said, "Since we were formed in 1967 the world for steel has substantially changed and so has this organization. We now are a truly global body representing 18 of the world's 20 largest steel companies, including six of the top 10 producers in China.

"Our new name provides a simple description of our role and clarity to our purpose," he continued.

Facilities

Stamper/Fabricator Invests in 6-kW High-Speed Laser

Matrix Metalcraft, Inc., Clinton Township, MI, has made its second laser-cutting-machine investment this year by adding the newest technology from Mitsubishi Laser to its equipment stable—the Mitsubishi Laser NX. The NX carries a 6-kW resonator and offers a maximum cutting speed of 2360 in./min. Matrix Metalcraft, which earlier this year purchased a Mitsubishi VZ1 cutting machine with pallet changer, will use the NX to cut, among other components, armor-plate products of 1.25-in. armor plate, as well as 1-in. stainless steel and 0.5-in. aluminum.

Ready Technologies Consolidates Operations

Bolden Die Supply—a division of Ready Technology—has consolidated its operation in Kennesaw, GA, with Ready Technology's corporate headquarters in Dayton, OH. The cost-saving consolidation will not interrupt customer communications with the company, as phone, fax and e-mail contacts remain unchanged.

Red Stag Adds Rigging Division

Hydraulic-press and plant-automation specialist Red Stag Engineering & Automation, Waupaca, WI, has formed a new rigging division so that it no longer has to outsource project rigging at customers' plants. The new division will encompass all facets of rigging to ensure complete, turnkey installations using laser technology, modern transportation modes and up-to-date rigging equipment.

Esab Receives Record Order, from Wind-Energy Customer

Esab Welding & Cutting Products, Florence, SC, has received its largest single-customer order for welding and cutting equipment and consumables. The multi-million-dollar order, received from Danish wind-tower manufacturer Vestas Towers A/S, includes automated cutting and welding equipment, positioning and handling apparatus and, once the equipment is installed early in 2009, the welding consumables needed for production.

Bystronic Cuts the Ribbon on Canadian Company

Bystronic Inc., Hauppauge, NY, a manufacturer of press brakes and laser- and waterjet-cutting machines, recently held a grand-opening ceremony for its new company, Bystronic Canada Ltd.

The new company, in Mississauga, Ontario, provides field service, parts stocking, technical support, machine installation and training.

Agreements

Bohler Uddeholm Acquires Wash. Distributor

Bohler Uddeholm AG, a supplier of specialty steels and materials, has acquired Summerville Steel Co., Kent, WA, a privately held distributor of specialty steel products. Investment banking firm McGladrey Capital Markets LLC initiated the transaction, led negotiations and acted as exclusive financial advisor to Summerville Steel.

Mayfran Acquires Canadian Conveyor Company

Mayfran Intl., Cleveland, OH, a manufacturer of engineered automation systems and equipment, has acquired Press Room Techniques, Lindsay, Ontario, Canada, a manufacturer of press-mounted conveyor systems for a variety of applications, including automating the handling of parts and scrap from stamping presses.

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TechUpdate

Multiple-Hydraulic-Press Cell Improves Cycle Times in Unique Applications

Phoenix Hydraulic Presses, Hilliard, OH, has custom engineered a heated-platen, two-column hydraulic press to improve the cycle times for bonding paper material to a metallic ring. Four separate cells were produced, each consisting of four 30-ton presses individually driven by a single power unit. Each of the presses feature 13 by 14-in. heated platens with insulation on the bottom and sides, capable of reaching working temperatures to 700 F.

The cells were designed to build pressure on one press while allowing movement of the next press platen, reducing cycle times. The presses are controlled by an Allen Bradley 505 programmable controller with an Allen Bradley Panel View 1000 operator interface to run machine functions. A 150-gal. floor-mounted hydraulic reservoir features spin-on filters.

The cell can be designed in a variety of tonnages and engineered to meet custom specifications and applications, and also can be outfitted with a complete automation system.

Phoenix Hydraulic Presses: 614/850-8940; www.phoenixhydraulic.com

Production Management System Offers Efficient Coil Management

Coil management is a primary feature of the Eclipse production management system— a complete management suite designed for metalforming facilities—from AMS Controls, Maryland Heights, MO. The software tool serves to eliminate mistakes and reduce scrap through better coil management. Upon loading, a coil is verified as a valid coil in the inventory as well as the correct material for the current order. If a partial coil is returned to inventory, Eclipse also will print a new coil tag with updated coil statistics for further

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tracking.

Efficient coil management is accomplished via the order-scheduling functions in Eclipse. Features allow for grouping orders by material type and color to reduce the number of coil changes and associated scrap. The software tracks coil usage, applying scrap and good footage to the applicable coil record, and updates order records with the coils used to complete each part.

Eclipse downloads orders directly from production scheduling to machines on the shop floor and uploads information directly from the shop floor, all the while allowing users to track status in real time. New features allow label design and printing.

AMS Controls, Inc.: 314/344-3144; www.amscontrols.com

Direct Scanning into Laser-Scanner Software Plus Enhanced Graphical Feedback

Laser Design Inc., Minneapolis, MN, announced that the Rapidform liveScan plug-in is available for the firm's line of Faro portable 3D laser scanners. The plug-in allows users who have portable Laser Design scanners with Rapidform software to scan directly into the software package and receive enhanced graphical feedback of the scanning process during data collection.

When using the plug-in while gathering scan data from the Faro arm, the user sees the point cloud being captured from the part in real-time during the scanning process. The screen updates to the user's viewing angle as the arm moves around the part. This feedback allows the user to adjust the scanning speed and approach, and shows areas where the user needs to go back and gather more data. This greatly improves the efficiency of the scanning process, according to company officials, resulting in significant time savings that translate into faster times to market.

Laser Design Inc.: 952/884-9648;

Fastening/Assembly **Technology**

New Technology Enhances Hardware Insertion

EuroBlech visitors last October in Germany got a good taste of how to improve the productivity of their fastener-insertion processes at the booth of Haeger, Inc., which displayed two of its newest products—the WindowTouch-3 that features a new and improved turret tool, expanded networking features and capabilities, and a new laser part-locating light. InsertionGraphics software provides a visual guide to the operator throughout the insertion process. The new Turret Insertion System (TIS-2) enables a metalformer to insert as many as four different fasteners in one part-handling operation. And tool-position feedback helps eliminate missing fasteners by preventing the operator from moving to the next fastener until all of the current fasteners have been inserted.

Haeger also displayed its OneTouch-3 with robotic integration, for customized automated hardware-insertion cells. It employs Motoman robots with part-handling capacity from 6.6 to 1100 lb. A servo-driven tool changer offers 3-sec. automatic tool changes; the machine offers part clearance to 5.5 in.; and, as with the WindowTouch-3, the unit can insert as many as four different fasteners in one material-handling step.

Haeger, Inc.: 209/848-4000; www.haeger.com

Metal-to-Metal Adhesive Bonds within 16 Min.

Devcon, Danvers, MA, has introduced Metal Welder II, a two-part, 10:1 methacrylate adhesive formulated for structural bonding of metal alloys to other alloys or to dissimilar substrates such as thermoplastics or composites. With a working time of 14 to 16 min., it is ideal for assembly of signs, appliances, furniture, consumer electronics and other OEM products. Mixed as dispensed from hand-held manual or pneumatic dispensers with static mixing nozzles, it attains functional cure in 2 to 4 hr. at room temperature. Metal Welder II requires no primers and produces permanent, load-bearing bonds that withstand service temperatures from -40 to 250 F and resist glycols, motor oil, mineral spirits and gasoline. The gel, with low-odor and low-VOC emissions, cures to a tensile shear strength of 2520 psi. Tensile elongation is 50 to 75 percent; impact resistance is 20 ft.-lb./in.^{2}.

Metal Welder II can be used in place of mechanical fasteners, and is particularly useful for bonding thin metal panels in applications where welding would produce aesthetically unacceptable dimpling or scorching. Because it distributes stresses over the entire length of the bond line instead of concentrating them at rivets or screws, the adhesive reportedly produces stronger bonds and prevents the loosening and leaking that can occur when fastener holes expand due to vibration or flexing.

Devcon: 800/933-8266; www.devcon.com

Fasteners with Paired Wave Washer Allow Panel Pivoting

New PEM SpotFast fasteners, from PennEngineering, Danboro, PA, paired with a specially designed wave washer, allow attachment of two thin sheetmetal parts in applications that also require pivoting or hinging action. The self-clinching fasteners (Type SFW)

permanently join the two panels to create a flush-attachment connection without protrusions on either side. The compatible wave washer delivers consistent torsion to promote repeatable hinging action while attachment remains secure.

The steel fasteners have zinc plating with integral lubricant to promote smooth operation. They can join dissimilar metal alloys or sheets with different thicknesses, and install in steel or aluminum sheets as thin as 0.031 in. with hardness of RB 80 or less.

To install the fastener, the fabricator first prepares a properly sized hole in both panels, then installs the fastener in one panel, places the wave washer over the installed fastener, and then situates the

second panel over the fastener. Sufficient squeezing force permanently fastens the joint smooth with the top sheet and flush or sub-flush with the bottom sheet.
PennEngineering: 215/766-8853; www.pemnet.com

Sheetmetal-Clinching Products Unveiled at EuroBlech 2008

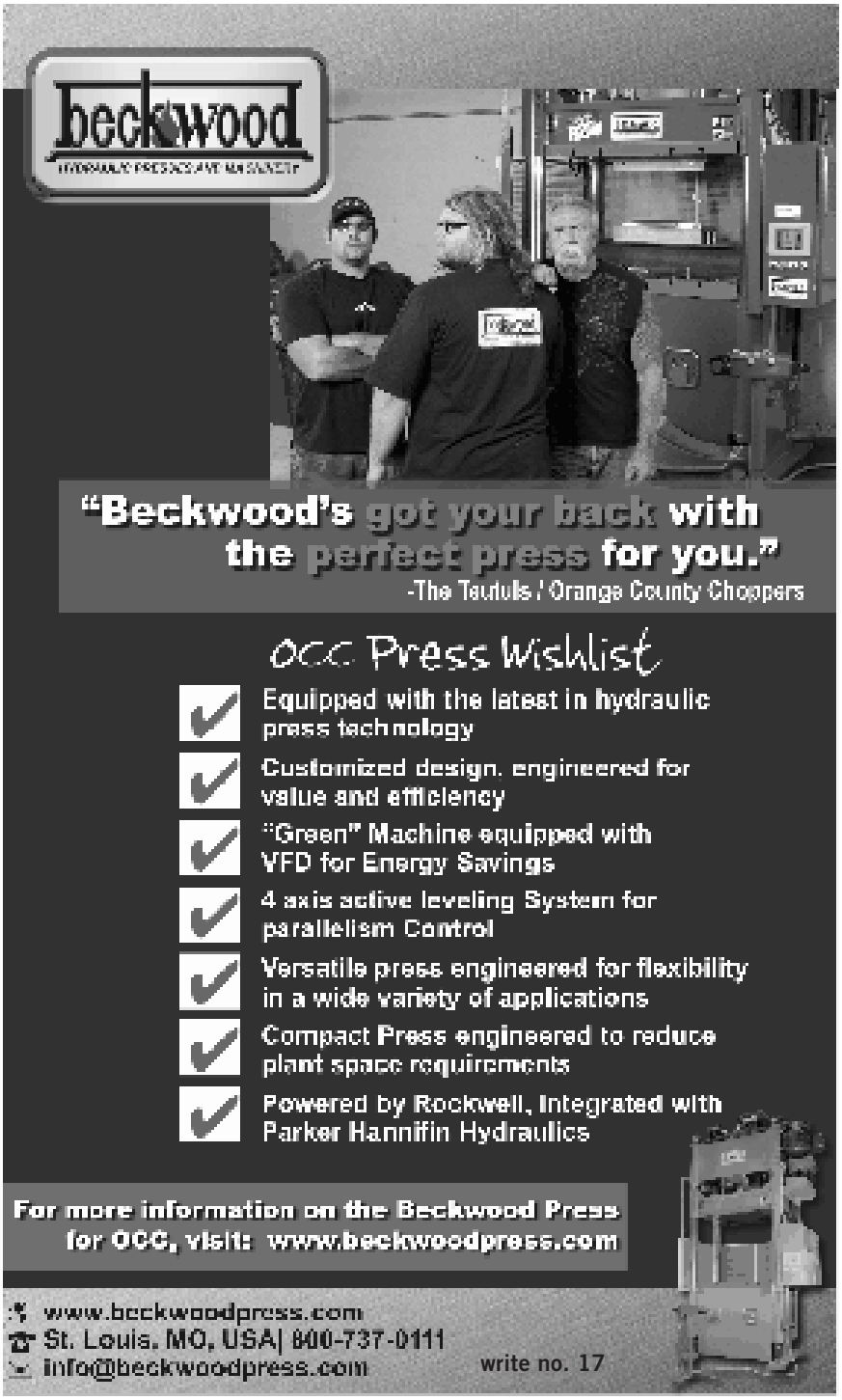
Tox Pressotechnik GmbH & Co. (with U.S. headquarters in Warrenville, IL) introduced two new fastening systems at EuroBlech. Its new Tox-Micropoint sheetmetal-joining technology allows fabricators to join small sheetmetal parts such as contact elements, springs and similar components (Fig. 1) made of steel, copper or aluminum with single sheet thicknesses from 0.1 mm to a total sheet thickness of 1.2 mm. Electric conductivity is retained in the joint, making the technique suitable for electric and electronic assemblies such as contact tabs, switch contacts and rockers.

Fig. 1

Fig. 2

Fig. 3

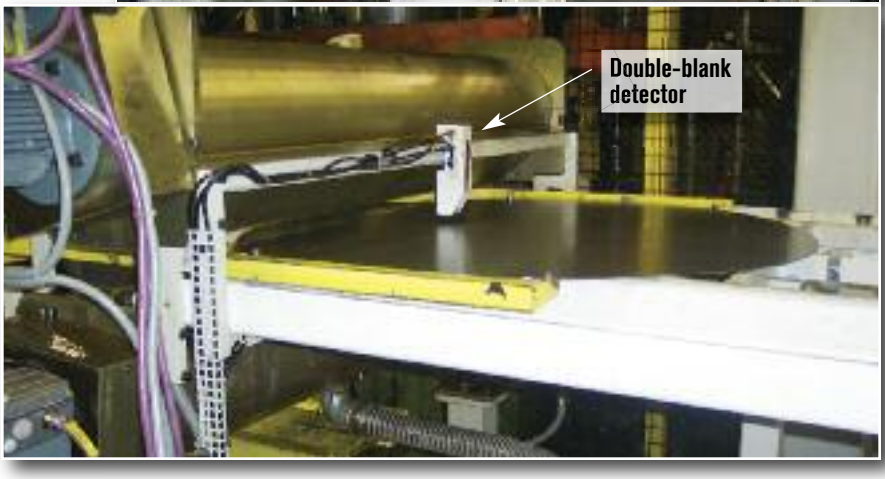
Tox also introduced to the EuroBlech crowd its new Twinpoint dual-punch joining system (Fig. 2-3) for small parts where optimum retaining forces are required. Twinpoint joins thin (0.2 mm) steel sheets, aluminum, copper and specialty-steel sheets to a total thickness of 11 mm.
Tox Pressotechnik: 630/393-0300; www.tox-us.com



Deep-Draw Automation Returns Remarkable Results

Robotic blank handling—from stack through lubrication and on to a hydraulic press—improves line speed by 25 percent. A double end-of-arm tool simultaneously removes a scrap ring and loads a new blank, with safety ensured as hands no longer enter the press.

BY BRAD F. KUVIN, EDITOR



The three-axis press robot (top) stationed at the 300-ton deep-draw press cell takes a 39.5-in.-dia. blank from the palletized stack and prepares to drop it into a centering station. The blank then moves, via a single-axis programmable shuttle (bottom), through a noncontact lubrication system and then is picked up again by the robot for loading into the press. Note the double-blank detector at the entry end of the lubrication unit.

No article interview could begin better than hearing the subject say, "This is the most successful capital-equipment project I have ever been involved with." And that is precisely what Todd Weston, manufacturing engineering manager at Amtrol Inc., exclaimed as we discussed the firm's recent deep-draw automation project. Amtrol, West Warwick, RI, builds pressure tanks and other commercial vessels for well-water storage, hydronic heating and other applications. A series of production lines —from deep draw to welding and assembly —turn out vessels from 6-in. to 6-ft. dia.

At the head of each tank line sits deep-drawing equipment for forming tank domes. Lines manufacturing smaller tanks—less than 15-in. dia.—host two hydraulic deep-draw presses, while lines for larger products employ one press to make a common dome for tank top and bottom. In all, the 200,000-sq.-ft. plant houses eight hydraulic presses, from 150- to 500-ton capacity. Conveyors automate flow from the presses through secondary processes—fabrication, welding, etc.—and on to final assembly and packaging.

Safety First—But Cost Savings are Nice, Too

A little more than 10 years ago, Amtrol began automating its hydraulic-press

The press robot's end-of-arm tooling (top) features a pair of end effectors—suction cups to manipulate the blank and magnets to remove the scrap ring from the previous press stroke. As the robot deposits the scrap ring onto a conveyor it drops the blank onto the die. Finished, drawn parts can be seen (bottom) exiting the press on a conveyor.

operations, all except for the line outfitted with a 400-ton press drawing 22-in.-dia. products. "We can't justify automation on that particular line," says Weston, "because volumes are too low, only 160 per day."

The last press automated by the firm, and the project that Weston spoke to me about, also manufactures 22-in.-dia. product, "but with a slightly less draw depth than the lower-volume manually fed operation," Weston says. The 300-ton hydraulic press draws 1200 domes a day. When Amtrol initiated the automation process for the press, in mid-2007, the stated goal of the project, says Weston, was safety-related. "To get the operator's hands out of the die," he explains. Also of concern was repetitive-motion stress, as operators had to load and unload blanks —39.5-in. dia. and of 0.062-in.-thick draw-quality Type 1008 steel—that weigh 35 lb. each.

"In addition to the operator having to load the blanks into the press," says Weston, "he first had to move each blank from the stack and into and out of a lubrication station. And, after every hit in the die, the operator had to remove a scrap ring that remains on top of the die from the previous stroke."

During production, as the punch descends it pinch-trims between the cutter and the die ring. The drawn dome leaves the press trimmed and the scrap ring remains on top of the die. Amtrol then performs a beading operation on the edge of the dome, and also uses the trimmed edge to track the weld joint during assembly.

Automation Opens Bottleneck

Before Amtrol completed the press-automation project, the 300-ton press ran at 3 strokes/min., which restricted production-line capacity on the popular 22-in. product used to manufacture the company's line of well tanks. One of its long-term goals, says Weston, is to evolve into more of a just-in-time delivery cycle and to cut its number of inventory turns in half. It maintains a warehouse facility near the factory, and hopes to reduce its reliance on warehouse storage and move more toward direct shipping from the factory.

"Direct shipping accounts for 10 percent of our business now," Weston says, "and we hope to get to 50 percent. Eliminating the bottleneck at the press, through this recent automation project, represents a big step in that direction. We've been able to increase the production rate to 4 strokes/min., a 25 percent gain."

Blanks Handled from Stack to Rack

To automatically handle blanks from stack to rack, Weston and his team at Amtrol invested in an automation system designed and built by AP&T North America, Inc., Monroe, NC. Included is an AP&T SpeedFeeder 60 three-axis press robot; two floor-mounted blank-storage magazines, each with a maximum stack height of 15.75 in. and four fixed permanent magnets used to separate the blanks; and a single-axis programmable blank feeder with double-blank detector, which shuttles blanks into a new noncontact lubrication unit.

The SpeedFeeder 60 lifts blanks from the stack and deposits them onto the blank feeder for loading into the lubrication unit. The SpeedFeeder then picks up the lubricated blanks at the opposite end of the lubrication unit and loads them into the die. It carries a unique double end-of-arm tool designed to simultaneously carry the scrap ring off of the die and deposit it onto a scrap conveyor while at the same time depositing the lubricated blank onto the die. Magnetic lifters handle the scrap ring as suction cups grip the blank. Finished, drawn domes drop below the press bed onto conveyors for transport to downstream operations.

"Ensuring that we have removed the

scrap ring from atop the die was a critical requirement in automating the process," shares Weston. The firm at first tried a single sensor to indicate to the press control when the scrap ring had safely exited the die. However, it quickly found a more reliable solution when it installed a full light curtain at the entry end of the scrap conveyor so that, regardless of where and how the end-of-arm robotic tool deposits the ring onto the conveyor, the light curtain senses its presence and then signals the press control to allow the press to stroke.

"Reliable communication between the AP&T line and the press control was a critical success factor for the project," adds Weston. "An Allen-Bradley unit at the press communicates with a Siemens control on the automation equipment. AP&T integrated the controls to ensure, job one, that the feeder does not enter the press bed until the automation control receives the appropriate signal from the press control and, job two, that the press does not cycle until the scrap ring has been removed and deposited onto the scrap conveyor."

Big Savings from Related Lube Project

In addition to automating the press, the new lubrication system delivered with the project spurred significant costs savings as well. The switch to an airless spray setup applying pure lubricant provides tighter control over the amount of lube deposited onto each blank, top and bottom, and eliminates some of the blotches of lubricant the line used to experience using a pressure-roll application system. "We consume about 25 percent less lubricant now," adds Weston.

The firm also recently switched lubes, going with a petroleum-free formulation, from Irmco, Evanston, IL. The lube washes off more easily than did the previous oil-based lube, using the same alkaline cleaner but at only a two percent concentration, compared to six percent previously.

"Not only do we need less cleaning solution to remove the lubricant from the blanks," says Weston, "but we also run the cleaning system at a lower temperature—130 F compared to 160 F before. The Irmco lubricant costs less than the previous lubricant we were using, we consume less, get better coverage on the blanks, and spend less money washing it off after stamping."

Also, weld rejects caused by residual lube on the parts have been eliminated since the Irmco lube not only is easier to wash off of the blanks, but also is "welding friendly," according to Irmco officials, and won't cause weld porosity.

So, what started as a safety project, installed in May 2008, has developed into a significant cost-saver for Amtrol. "We're definitely on schedule, or ahead of schedule, to satisfy our projected 3-yr. return on investment," Weston says. "The line is performing better than we ever expected." **MF**

write no. 18

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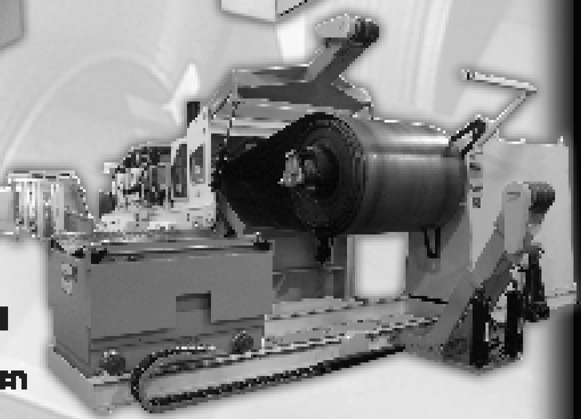

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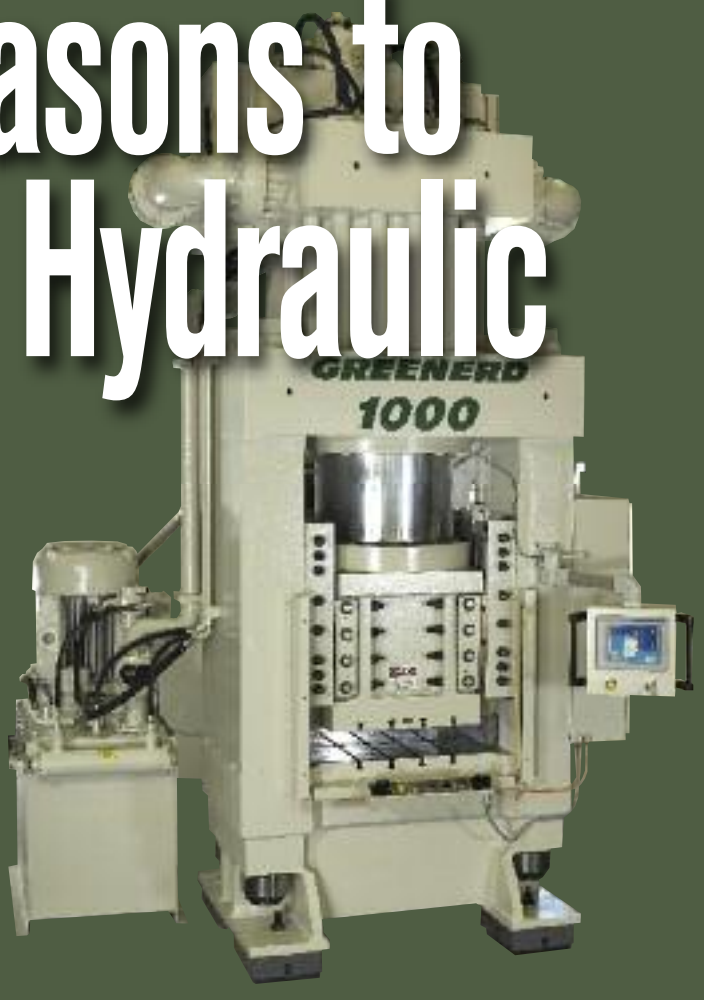
TOP 10 Reasons to Go Hydraulic

After careful assessment, you may find that hydraulic presses bring improved productivity at a reduced cost—ideal not only during difficult economic conditions, but for the ever-growing demands for smaller lots and varied applications.



The Top Ten

1) Reduced setup and changeover time
2) Flexibility for various applications
3) Full power at any point in the stroke
4) Built-in overload protection
5) Low operating costs
6) Larger capacities at lower costs
7) Greater control
8) Reduced noise
9) Optimized space
10) Safety

A down economy is the perfect time to evaluate production efficiencies, or lack thereof. A thorough examination of pressworking operations may indicate that hydraulic-press technology is more efficient for certain applications than are mechanical presses. Hydraulic presses handle a range of applications, broadening opportunities for more business, and offer metalformers a number of unique benefits. Today's hydraulic presses, faster and more reliable than ever, feature significant technology upgrades. Improvements in seals, more efficient pumps, and stronger hoses and couplings have virtually eliminated leaks and minimized maintenance.

Check out these Top Ten benefits of hydraulic presses and then complete the hydraulic features rating. Perhaps you'll find that it's time to get serious about going hydraulic.

1) Reduced Setup and Changeover Time

Hydraulic presses save time during setup and changeovers. Delivery of full power at any point in the stroke negates the need to determine the exact location of maximum tonnage. Thus, hydraulic presses eliminate the tricky, time-consuming task of setting the stroke on a mechanical press, enabling more rapid job changeovers.

2) Flexibility for Various Applications

Hydraulic presses have become increasingly common on high-volume production lines. A single hydraulic press can perform a variety of jobs within its tonnage range. Common applications include deep drawing, shell reduction, urethane bulging, forming, blanking and piercing, staking, punching, press fitting, straightening and assembling. Manufacturers also employ hydraulic presses for powdered-metal forming, abrasive-wheel forming, bonding, broaching, ball sizing, plastic and rubber compression, and transfer molding.

Programmable logic controllers and other electronic controls have improved speed and flexibility. With new computer interfaces and monitoring, hydraulic presses find wide use in advanced computer-integrated manufacturing systems.

Hydraulic presses perform the jobs listed below, and hundreds of others.

• Electric-motor manufacturers assemble motor shafts to rotors, compress laminations and press cores into housings.

• Automotive manufacturers press tiny shafts into water pumps, assemble

shock absorbers, blank and form diaphragms, and stake disc brakes together.

• Jewelers coin Boy Scout pins.

• Aerospace companies form tough titanium housings.

• Huge forming presses shape tuba bells and cymbals.

• Presses straighten hardened road-grader blades and machine ways.

• Hollowware manufacturers blank and draw brass bowls automatically from coiled stock.

• Equipment presses computer-disc shafts into precision bearings.

3) Full Power at any Point in the Stroke

The full power of a hydraulic press can be delivered at any point in the stroke. That means not having to buy a 200-ton-capacity press to achieve 100 tons of force throughout the stroke. Other advantages include faster setups and no time-consuming adjustment of the stroke nut on the slide to accommodate different dies.

4) Built-in Overload Protection

Hydraulic presses provide built-in overload protection. For example, a 100-ton hydraulic press will exert only the specified tonnage—100 tons pressure if set for 100 tons, or less if set for less—no matter what mistakes are made during setup. This eliminates worries about overloading, or damaging the press or die. When a hydraulic press reaches its set pressure, a relief valve opens to ensure that no additional pressure is created and there is no danger of overload.

Built-in overload protection also applies to the tooling. Tooling built to withstand a certain load is in no danger of damage due to overloading—tools can be sized to withstand the load of a particular job, not a particular press. The pressure of the press can be lowered to suit the job, and the lack of impact, shock and vibration promotes longer tool life.

5) Low Operating Costs

Relatively simple design means that hydraulic presses can provide a significant cost advantage over mechanical presses in comparable sizes. Moving parts, few in number, remain fully lubricated in a flow of pressurized oil, and breakdowns are infrequent and usually minor. Typical routine maintenance tasks include replacement of packing, solenoid coils and, occassionally, a valve. These inexpensive parts are easily replaced without disassembling the entire machine, increasing uptime and decreasing maintenance costs.

6) Larger Capacities at Lower Costs

Metalformers can inexpensively purchase certain capacities in hydraulic presses. Stroke lengths of 12, 18 and 24 in. are common with extra stroke length provided relatively easily. Daylight, too, can be added without much additional cost. Hydraulic-press purchasers also can choose larger table areas and small presses with big bed areas—large 200-ton presses with relatively small beds are available as press tonnage does not dictate bed size.

7) Greater Control

With a hydraulic press, ram force, direction and speed, the release of force, and the duration of pressure dwell can be adjusted to fit a particular job. Jobs with light dies can be performed with reduced pressure—the ram can approach the work rapidly, then shift to a slower speed before contact, prolonging tool life. Timers, feeders, heaters, coolers and a variety of auxiliary functions can be brought into the sequence to suit the job.

8) Reduced Noise

Fewer moving parts and elimination of a flywheel reduce the overall noise level of hydraulic presses as compared to mechanical presses. Properly sized and mounted pumping units meet and exceed current federal standards for noise, even with the pumps under full pressure. Due to control of each phase of ram movement, noise levels also can be controlled—a hydraulic ram can be programmed to pass through the work slowly and quietly.

Rate the importance of the following features from 1-10
(1 is not important at all and 10 is very important)

Feature	Rating
Ease of setups and changeovers	
Application flexibility	
Full power stroke	
Overload protection	
Lower operating costs	
Large capacity for low cost	
Press control	
Noise reduction	
Maximize floor space	
Safety	
Total Score	

If your score is between:
10 and 30, then perhaps you're doing fine with your mechanical presses for now.
31 and 50, then you might want to start gathering some data on going hydraulic.
51 and 70, then you should think about moving to hydraulic presses.
70+, it's time to get serious about going hydraulic. Evaluate your needs and start talking to hydraulic-press manufacturers.

9) Optimized Space

Hydraulic presses feature a compact design—a typical 20-ton unit measures 8 ft. high, 6 ft. deep and 2 ft. wide while a 200-ton press measures only 10 ft. high, 9 ft. deep and a little more than 3 ft. wide. At 10 times the capacity, the 200-ton press only takes up 50 percent more room, optimizing pressroom floorspace.

10) Safety

Improperly used, all machines are potentially dangerous. But because hydraulic presses control ram movements, these presses easily can be made safe. Non-tie-down, anti-repeat, dual-palm button controls provide safety. And the nature of a hydraulic-press control system allows simple interlocking of guards and incorporation of other safety devices. **MF**

Information for this article provided by Greenerd Press & Machine Co., Inc., Nashua, NH. Tel. 603/889-4101; www.greenerd.com.

A new forming line at the York, PA, facility of GEA PHE Systems employs hydraulic-press technology containing many small cylinders rather than one large one, to achieve full force. The small cylinders fill faster and require substantially less compressible oil compared to a press with a large cylinder and longer stroke, resulting in much faster cycle time and higher output.

Multi-Cylinder Press Enhances Heat-Exchanger Production

The use of several small cylinders in this unique hydraulic-press design allows more precise control of material flow, a must in the exacting work of producing heat-exchanger plates.

As a leading U.S. manufacturer of gasketed, fully welded and brazed-plate heat exchangers, GEA PHE Systems NA, Inc.'s products find use in residential, commercial and industrial applications in sectors as diverse as chemical, food, sugar, marine, power, HVAC, renewable energy and refrigeration. Part of the GEA Process Equipment Division of the international GEA Group, the company maintains production facilities in Germany, Sweden, Canada and India as well as the United States, and distributes the heat exchangers worldwide.

To gain productivity and maintain precise material control throughout the forming process to produce the heat exchangers, the company has employed a new short-stroke multi-cylinder hydraulic press from Schuler Inc., Canton, MI.

Needed Press to Provide Precise Forming

Compact, efficient and cost-effective heat-exchanger designs at GEA PHE Systems depend on precise engineering and manufacturing, with tolerances as tight as 0.002 in. for channels and bevels.

In planning its new production facility in York, PA, the company set out to design-in extremely high precision and productivity. Jean-Pierre Castenetto, GEA Ecoflex head of production and logistics, developed an ambitious wish list for the new production line:

- Encounter very low bolster and table deflection;
- Gain the ability to make a variety of plate sizes in several material types requiring a high press force;
- Develop an automated system requiring a single operator.

"We also needed high levels of flexibility and productivity, including a faster process and the ability to minimize downtime by changing dies quickly to make different-sized plates," says Castenetto. "Plus, a high level of automation was important for meeting our productivity goals."

Fully Automated and Flexible

Schuler responded with a concept for a custom hydraulic-press system featuring a short-stroke, multi-cylinder design. This approach allows precise material flow with high final quality—no wrinkles or defects, according to Schuler officials.

The system—Schuler engineered, manufactured, delivered and installed it as a turnkey project—includes a decoiling line with a shear, automatic feeding with a single-rail shuttle into the emboss-

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ing press and a die-change cart able to simultaneously handle three dies, allowing complete die change in less than 30 min. It also includes a single-rail shuttle that removes formed plate from the embossing press and transports it to a blanking press. The exit side of the blanking press features gantry-type automation to remove and stack the plates.

The press employs many small cylinders rather than one large one, to achieve full force. The small cylinders fill faster and require substantially less compressible oil compared to a press with a large cylinder and longer stroke, resulting in much faster cycle time and higher output. Repair time and expense also are greatly reduced compared to what a large-cylinder design would require, say Schuler officials.

In addition, the multi-cylinder design allows GEA PHE Systems to make heat-exchanger plates in a variety of sizes, providing the flexibility to meet changing production needs and customer demand. The company now produces as many as four parts/min., with one operator handling the entire process. For the 28,000 tons of force provided by the press, the output rate is believed to be one of the best in this industry, add Schuler officials.

John Garrity, production manager for gasketed-plate heat exchangers at GEA PHE Systems, likes the press' versatility and high level of automation.

"It provides us with the flexibility to quickly change jobs and make a variety of plates," he says. "Plus, we can provide blanks to other processes within our company, and we can do it all with just one operator. That's a tremendous productivity advantage."

How the Heat Exchangers Work

Brazed-plate heat exchangers manufactured by GEA PHE Systems consist of formed stainless-steel plates, brazed together in a vacuum furnace. The company's gasketed-plate heat exchangers consist of formed plates in several materials, including stainless-steel types 304 and 316 as well as titanium and other rare alloys. The plates feature NBR, EPDM, Viton and Hypalon gaskets and are assembled in a frame in carbon (painted or cladded) or stainless steel.

When stacked, the plates form two separate flow passages, allowing a liquid or gas to flow between every other plate. The result: high-performance heat-transfer surfaces in a compact, cost-effective design.

GEA PHE Systems forms these heat-exchanger plates on its new multi-cylinder hydraulic press.

Numerous Applications for Multi-Cylinder Technology

Though designed specifically to meet the needs of GEA PHE Systems, Schuler sees numerous other opportunities for its multi-cylinder technology.

"The market for this type of multi-cylinder hydraulic-press technology is fairly diverse," says Oliver Beisel, director of sales for Schuler Hydrap. "While well suited for complex applications such as that at GEA PHE Systems, it's also ideal for deep drawing stainless steel in applications such as kitchen sinks." For deep drawing stainless steel, the system works in combination with an active die cushion and a multi-cylinder plate, which functions as a hydraulic cushion underneath the blankholder. In contrast, in an embossing press the multi-cylinder plate only applies press force.

For stainless deep-drawing applications, the system acts as support in controlling material flow during the draw. The cylinders in the multi-cylinder plate can be grouped together into different circuits, enabling the operator to precisely control material during forming. Areas can be fully clamped where no material flow is desired because of the risk of fracture, while in other areas the blankholding force can be reduced to control material flow and avoid defects such as wrinkling. **MF**

Information for this article provided by Schuler Inc., Canton, MI. Tel. 734/207-7200; www.schulerinc.com.

The new hydraulic-press system at GEA PHE Systems includes a decoiling line with shear, automatic feeding with a single-rail shuttle into the embossing press and a die-change cart able to simultaneously handle three dies. A single-rail shuttle removes formed plate from the embossing press and transports it to a blanking press. The exit side of the blanking press features gantry-type automation to remove and stack the plates.

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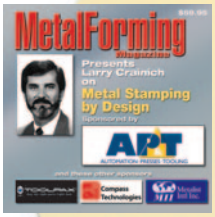

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Pulsed GTA Welding Nets Big Productivity Gains

Aftermarket exhaust-system manufacturer credits pulsed gas-tungsten-arc welding for its successful shift to inhouse production.

Big Gun Exhaust, Rancho Cucamonga, CA, a manufacturer of aftermarket exhaust pipes, has grown to become the third largest supplier in the ATV market. But such growth hasn't come without challenges. Mike Young, owner of Big Gun and a championship motorcycle racer, began the company with the belief that he could outsource everything but the design of his product.

Challenges in Bringing Production Inhouse

"Unfortunately, you can never get the product on time, pricing is never right and the quality isn't what you want," says Young, recalling his outsourcing experiences. "So in 2007 we decided to manufacture inhouse, and now we build our product the way we really want to build it, so the quality is superior. We build every piece by hand."

Now, with 13 employees, as well as three at a powder- and ceramic-coating facility next door, Big Gun sells to dealers around the world. While Big Gun is ramping up inhouse production, Young still sees the importance of slow and steady growth to achieve the highest-quality product.

"We need to be kicking out 200 to 250 units a week, and that's not enough to meet demand, but we've got to take gradual steps," he says. "We still have to outsource to one other shop, but we finish the products here. We double-check everything and then package and ship."

Young credits use of the Dynasty 200 gas-tungsten-arc (GTA) welding machine from Miller Electric Mfg. Co., Appleton, WI, for helping the company approach its weekly goal of producing 250 performance pipes, made from 0.035-in.-thick Type 304 stainless-steel tubing. "The Dynasty got us up to 50 pipes per week right away," he says, noting that further adjustments to the manufacturing process have allowed Big Gun to currently produce 150 units weekly.

Proper Fixturing a Must

Because every pipe requires six to 16 fixtures, welding is the largest part of the manufacturing process at Big Gun.

"Fixturing is one of our most rigorous processes because the fixture replicates the exhaust system," says Young. "It's a tedious process but fruitful because we take the time. Our product is going to fit better than when we out-

Before an exhaust system is ready for manufacturing, fixtures must be custom fitted from a finalized prototype. Considering that many pipes require as many as 16 fixtures, consistency and quality control in fixturing are critical to the company's inhouse operations.

sourced because now we have fixtures that match the whole pipe."

Following the prototyping and fixturing process, the system is welded—very carefully.

"You've got to be careful that you don't distort it, because when the pipe gets hot, the materials move," says Young. "The part has to fit into the fixture without a problem or it goes into the trash and we start over."

Between these two steps, fitup and welding, the company has no room for error. Each fabricated pipe must be identical and perform in exactly the same manner.

Uniform Welding Pipe After Pipe

In terms of welding alone, the Dynasty helps Big Gun achieve uniformity because, among other things, operators have more heat-input control, according to Frank Sison, head of manufacturing at Big Gun.

Pulsed Welding Assists in Stainless Work

The challenge of welding thin-gauge stainless steel involves achieving adequate penetration without overheating. Unlike other alloys, stainless steel does not adequately dissipate heat when welded, instead holding heat in the area of concentrated welding arc. Excess heat causes major problems, including warping, embrittlement and rust. Warping usually leads to costly part scrapping, and temperatures above 950 F cause stainless steel to become brittle, causing the alloy's mechanical properties to fall short of required specifications. Excess heat also boils off stainless' alloying elements and concentrates carbon, which remains trapped in the heat-affected zone as the steel cools. Given time, the area overloaded with carbon will rust, negating stainless steel's best-known property.

Where excess heat, loss of mechanical properties and warping are issues, pulsed welding can provide the solution. With pulsed gas-tungsten-arc welding (GTAW), the arc pulses between a high peak and low background current. The peak current provides good penetration while the background current allows the weld puddle to cool slightly, preventing warping, embrittlement and carbide precipitation.

Higher pulsing—generally above 100 pulses/sec.—increases puddle agitation, which in turn optimizes grain molecular structure within the weld. High-speed pulsing also constricts and focuses the arc. This increases arc stability, penetration and travel speeds, and produces a small heat-affected zone.

High-speed pulsed GTAW requires using an inverter power supply. Conventional GTAW limits pulsing to a relatively narrow range of 0.25 to 10 pulses/sec., where inverter technology enables pulsing to 5000 pulses/sec.

Must Set Starting Variables

Pulsed GTAW requires setting four variables: peak amperage, background amperage, peak time and pulse rate.

Peak amperage, peak time: Determine good values for setting peak amperage in the same manner as setting maximum amperage values for regular DC GTAW: 1 A for every 0.001 in. of thickness.

Peak time is the percentage of time during one pulsing cycle that the power source spends at the peak amperage (main amperage). With peak time of 80 percent and a rate of 1 pulse/sec., the inverter will spend 0.8 sec. at peak amperage and 0.2 sec. at background amperage. Increasing peak-time percentage adds more heat to the part, while decreasing reduces heat. As a rule of thumb, begin experimenting at 50 to 60 percent peak time.

Background amperage: The background amperage is a percentage of the main amperage set on the machine. Thus, a machine set for an output of 150 A and background amperage of 30 percent produces a background amperage output of 45 A. Lowering the background-amperage percentage reduces the average heat input, while increasing it raises overall amperage.

Notice how background-current adjustments affect weld-puddle fluidity. Use enough background current to shrink the puddle to about half of its normal size while still keeping the puddle fluid. When welding stainless and carbon steels, start by setting the background amperage at 20 to 30 percent of peak amperage.

Pulse rate: The pulse rate is how many times the machine will complete one pulsing cycle in a time span of 1 sec. Increasing the pulses/sec. produces a smooth ripple effect in the weld bead, narrows the weld bead and adds a cooling effect. Reducing the pulses/sec. widens the weld bead. Slower pulsing also helps agitate the puddle and releases any porosity or gas trapped in the weld.

Some beginning GTA welders use a slow pulsing rate—0.5-1 pulses/sec.—to help them develop a rhythm for adding filler metal. For welding carbon or stainless steel, use a rate of 100 to 500 pulses/sec., starting at 100 and working upward. Working at rates surpassing 500 pulses/sec. generally requires automated welding.

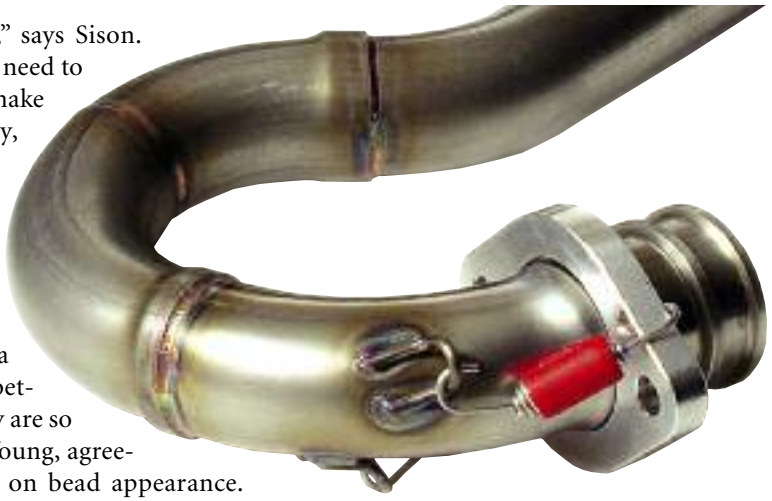
"The crucial part of welding is not getting material hot to the point where it changes shape and doesn't fit in the fixture," says Sison. "With the Dynasty, I get a finer bead so the part stays cooler and doesn't warp."

Greater control is just one benefit of this advanced inverter-based power source, as the Dynasty has a state-of-the-art operator interface that offers a built-in pulser and more control of output parameters than a traditional GTA machine, according to Miller Electric officials. Prior to using the Dynasty 200 DX, Sison hadn't worked with a pulsed welder, but he now appreciates pulsing for reducing heat input and adding arc stability. "I used to perform pulsed welding myself by hand," says Sison. "The pulser is an ideal feature that, now, I don't think I can work without."

The ability to fine-tune output parameters saves Big Gun significant time.

"You get exactly the right-sized bead as you weld it," says Sison. "And you don't need to go over it and make it look pretty, because it's pretty the first time."

"Our welds look like they were performed by a robot, but are better because they are so flawless," says Young, agreeing with Sison on bead appearance. "The fabrication is so clean, and everything has been deburred so well that it's smooth, which is important because burrs can kill the power."



This closeup shows the weld bead and its relatively small heat-affected zone on Type 304 stainless-steel pipe. A small heat-affected zone helps to avoid warping and ensures precision fit and performance.

Smooth Starts, Other Advantages to New Welder

Sison also notes the smooth starts associated with the GTA welding machine that assist in manufacturing gains at Big Gun.

Each fabricated pipe must be identically placed in the fixture in order to perform in exactly the same manner. The high-speed pulsing feature of Big Gun's new welding machine constricts and focuses the arc, allowing operators greater control over arc stability and heat input, allowing parts to stay cool and avoid warping.

"I can set the power supply on a lower amperage and actually work with it," he says. "With our older machine, we could only go so low and the arc wouldn't start. And when it did, it would blow a hole. You can actually finesse your start, and that's what I really like about this machine."

The Dynasty's advanced inverter technology with Auto-Line power-management technology allows Big Gun to hookup to 120 to 460 V, single- or three-phase power with no manual linking, and reduces power draw.

"Our other machine sucked so much power out of this place," says Young. "It was always popping breakers. Now we can run three machines at one time without any problem."

At a rated output of 150 A, the Dynasty draws only 15.8 A of primary power. Compared to a conventional 250-A GTA welder, the Dynasty uses primary power four to five times more efficiently, according to Miller Electric officials. With such minimal amperage draw, Big Gun can plug in five of the welders for each conventional power supply. **MF**

Information for this article supplied by Miller Electric Manufacturing Co., Appleton, WI. Tel. 920/734-9821; www.millerwelds.com.

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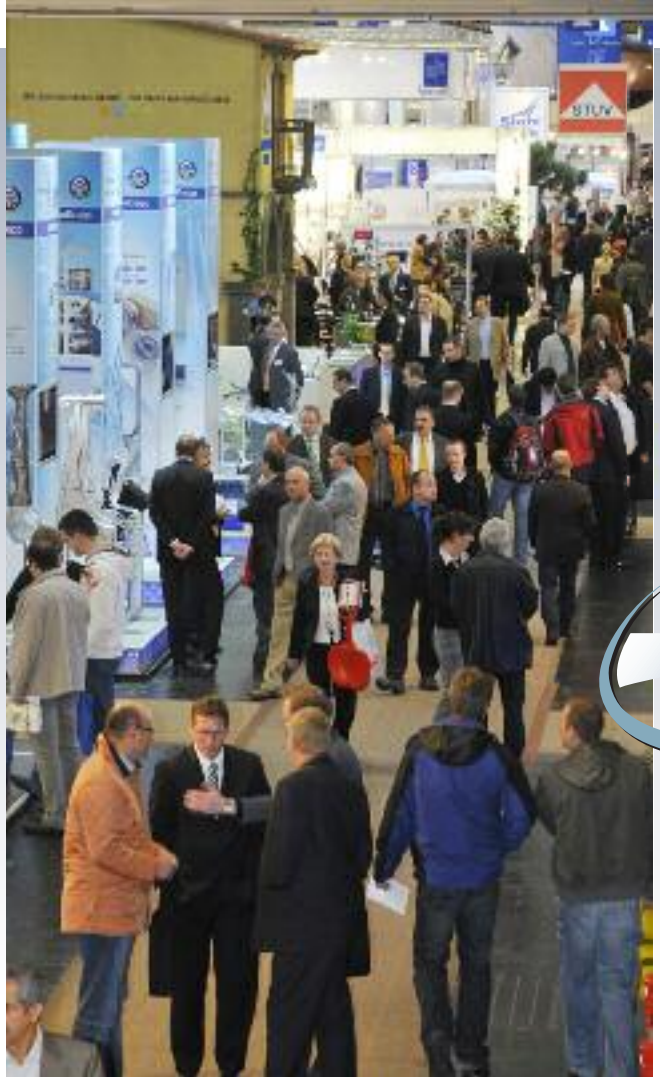


Sensory Overload at EuroBLECH 2008

Record-setting attendance and exhibitor counts set an overwhelming stage at the technology-laden EuroBlech 2008 exhibition, October 21-25, 2008, in Hanover, Germany.

BY BRAD F. KUVIN, EDITOR

You sure couldn't gauge the state of the global economy by the buzz generated last October at EuroBlech 2008, for this was another record-breaking show, marking the 20th edition of the International Sheet Metal Working Technology Exhibition. Held October 21-25 in Hanover, Germany, EuroBlech 2008 registered an increase of 8 percent for exhibitors and attendees over the 2006 edition. The show's machine displays consumed an exhibition area of 87,700 sq. m, up 15 percent from the 2006 show, and nearly 70,000 visitors explored the booths of 1520 exhibitors representing 38 countries; 35 percent of those visitors came from outside Germany. Show organizer Mack Brooks Exhibitions also noted an above-average increase in the number of attendees from the United States.

What follows are just a handful of the new-technology highlights gathered from walking the floor of the numerous exhibit halls of the city within a city that is EuroBlech. We'll have more in coming issues of *MetalForming*. And, plan now to attend the next edition of EuroBlech, October 26-30, 2010.

Amada Introduces High-Speed Laser System and New Laser-Punch Combo

The enormous Amada booth featured several new machines, including the LC-F1NT series of high-speed laser-cutting machines boasting linear drives in the x, y and z axes. With power options to 6 kW, the machines also feature water-assisted cutting and twin-adaptive lens technology to eliminate the need to change lenses based on material thickness. I viewed a demonstration at the booth, cutting 0.8-mm aluminum and 6-mm steel with the same lens.

Also introduced at the show was Amada's new entry into the laser-punch combination machine market, the LC2012 C1 NT (pictured), which we're told will be introduced to the U.S. market later this year. Touted as the firm's first small-format hybrid machine—the laser moves in one axis while the sheet-metal workpiece moves in the other axis—it features a 45-station turret and offers a 12-mm form height. Compared to previous machines, we're also told that the LC2012 C1NT offers improved accuracy—±0.07 mm vs. 0.1 mm.

www.amada.com

Linear-Robot System Optimizes Press-to-Press Motion

Ideal to automate new press lines or to retrofit and upgrade existing lines, the FeederPlus linear robot combines the benefits of linear and articulated robots by carrying out linear moves yet offering rotational axes to orient parts during transfer between presses. Speed maxes out at 12 large parts/min. Two models are available—an 80-kg-payload model with minimum gap between presses of 5500 mm; and a 120-kg model with minimum gap of 6500 mm. Max gap between presses or both models is 11,000 mm. Position repeatability is ±1 mm. Tooling connection is either crossbar with saddle or adapter for robotic tooling.

www.strothmann.com

Tooling for Extreme Punching Work

Dura Punch tooling—punches and retainers in a variety of shapes and in inch and metric sizes—highlighted the stand of Moeller Manufacturing Co. Designed for heavy-duty work, the punches boast a thicker head, a radiused transition and a chamfer on the head to better distribute forces and minimize the likelihood of breaking. Models include solid or ejector with standard point or reduced shank, and retainers for round or shaped punches. Also available: shoulder and reduced-shank punch blanks.

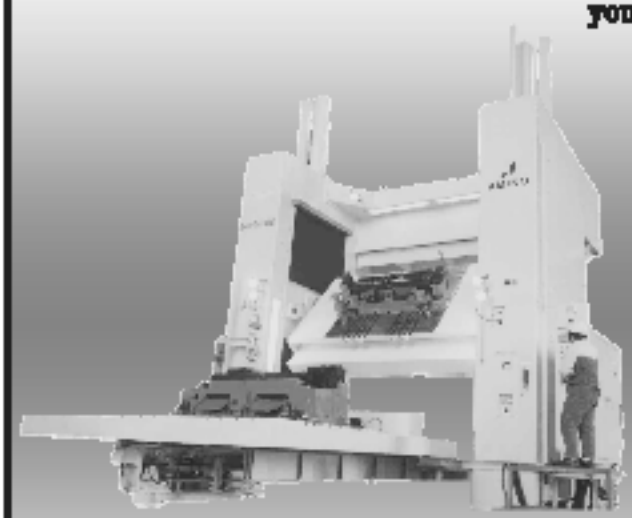
www.moellerpunch.com

Long-Bed High-Speed Press

A 60-ton 50-in.-bed Model BSTA 510-125 high-speed press starred in the Bruderer stand. Compared to the previous model, the BSTA 500-110, the new press offers an extra 7 in. of bed length. This allows for higher bending moments and more room for die stations. Bruderer designed the press to allow for minimized bending strain and to increase the ram's resistance to tilt. Maximum press speed: 1050 strokes/min.

www.bruderer.com

AMINO DIE REVERSING MACHINE (DRM) PRESSES



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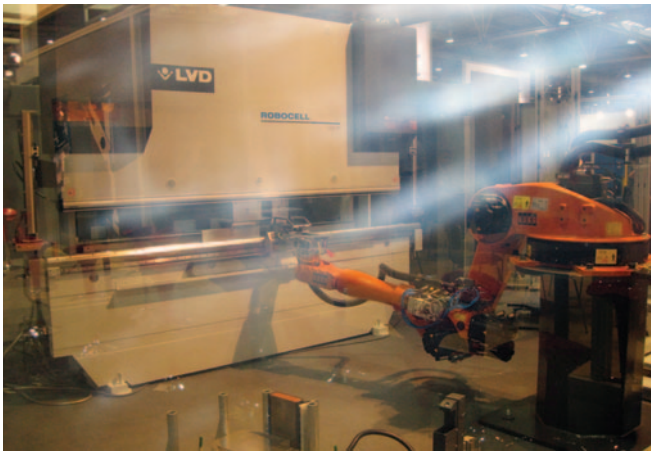
Robots Make a Big Splash for Automating Brakes and Presses

LVD made a huge splash at EuroBlech with its largest stand ever, showcasing new concepts in press-brake, laser and punch-press automation and, for bending particularly thick and hard materials, its new Easy-Form 200 adaptive forming system for plate as thick as 30 mm.

LVD has focused on mid-level automation, company representatives say, where there is an optimum trade-off between automation and cost. It also has begun to integrate more and more standard robots into its fabricating machines.



A good example of this philosophy, on display at the exhibition, is the Robocell (pictured), a compact automated bending cell for small and medium-sized components that combines an LVD PPEB press brake with a Kuka handling robot. The press brake is mounted at a normal operating height and the robot is placed 2 m from the bend line to allow unhindered access should a fabricator wish to operate the press brake manually. The cell would typically include two input stations, a centering table, a regripping station and two output stations.

LVD also offers robots to automate loading and unloading of punch presses. At EuroBlech it displayed its Pick-Sort system that uses a Kuka robot to turn a Strippit V-series machine into an automated punching system. In contrast to other pick-and-place automation systems, the pick-Sort carefully places parts onto a stack rather than dropping them.

Also new for EuroBlech: the Strippit LP-1225 laser-punch combination machine; and LVD's latest addition to its Axel series laser cutting machines, the Axel 4020.

www.lvdgroup.com

Schuler Surveys Customers Before Introducing New Coil Feeder

Modularity and global sourcing of components—that's what customers asked for when Schuler surveyed them when developing its new Power Feed coil-feeding system. Among key

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features are the use of servo direct drives and low-clearance maintenance-free planetary gears. Customers can select among three models based on coil weight capacity, and can then, based on changing needs in the pressroom, retrofit to upgrade capacity. Due to the modular design of the feeder, even maximum coil width can be adapted to suit customer needs.

www.schulergroup.com

Mechanized Plasma-Arc Cutting Setup Showcased

Amongst the bevy of booths showcasing cutting and welding equipment was that of Thermadyne, which introduced its Ultra-Cut 300 family of cutting systems under the Thermal Dynamics brand. Ultra-Cut setups combine an inverter power supply, a new gas-flow management system and the XT-300 torch. Visitors to the stand witnessed the new XT-300 robotic-cutting torch. Auto-Cut systems are available with 100-, 200- and 300-A capacity.

Thermadyne also introduced its Cutmaster A-series compressed-air plasma-cutting machines for mechanized cutting; and Cutmaster True series of six manual air-plasma cutting machines with the ATC (Advanced Torch Connector) quick-connect system.

www.thermadyne.com

New, Energy-Efficient Punch-Shear Combo

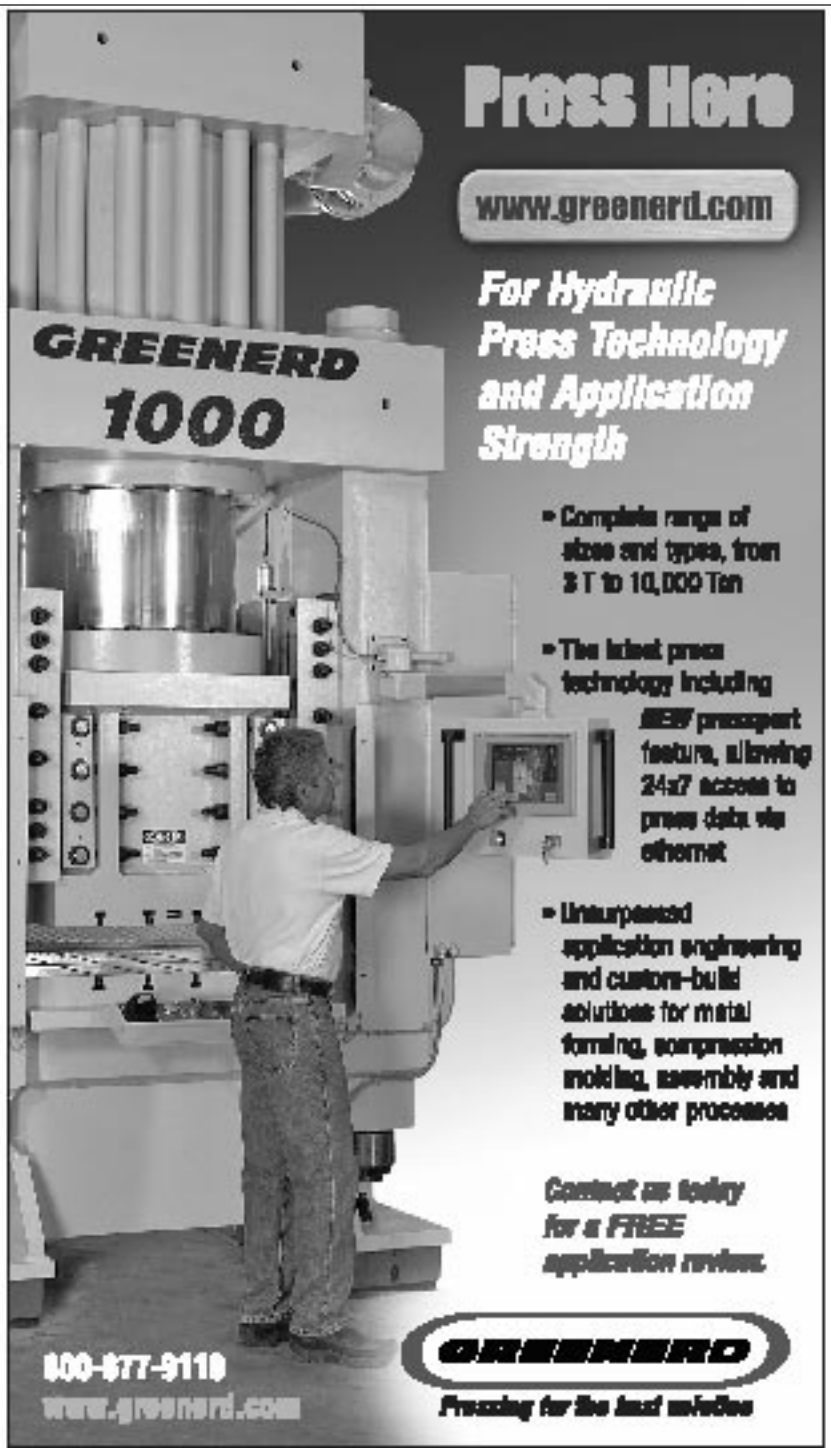
Salvagnini America introduced a new generation of its S4 punch-shear combination machine—the Salvagnini S4X, promising enhanced flexibility, accuracy, energy conservation and productivity. The X-series machine features a completely redesigned manipulator powered by two pairs of rotary electric motors. The first pair employs rack-and-pinion kinematics while the second pair uses two ball-bearing screws to position the sheet.

The new manipulator enables the S4X to offer increased processing speed, reduced cycle times, and increased productivity and accuracy. All of the S4X's 96 punching-tool stations are live and ready to simultaneously punch, countersink and emboss parts. And the built-in shear makes cuts of any length.

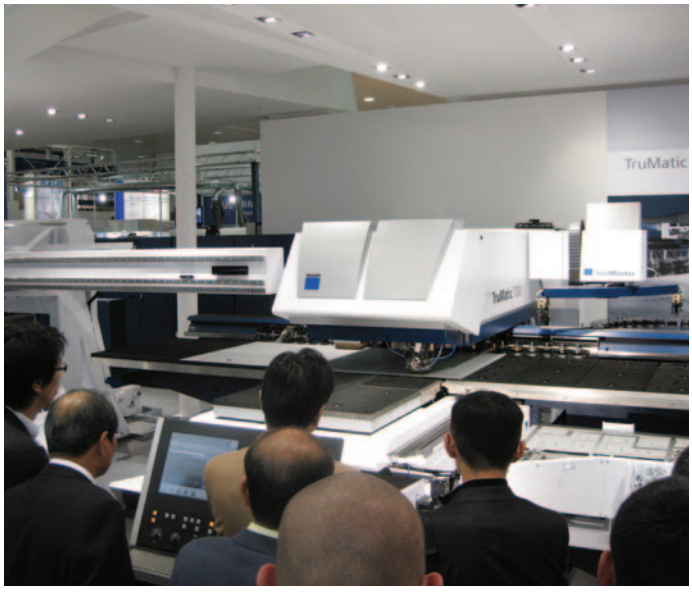
Other major upgrades in the X-series machine include a new hydraulic power pack that reduces power consumption by 30 percent, an optional Cartesian stacker, and the expanded ability to incorporate all types of feeding connections.

Salvagnini debuted the S4X along with its P4X panel bender at EuroBlech. We were told that compared to previous models, the new machines offer as much as a 20 percent increase in speed and cycle time. Following the show, the S4X on display was shipped to Danish manufacturer Expedit; the P4X was delivered to the German company Klingenburg, a manufacturer of ventilation systems.

www.salvagnini.com



Trumpf Debuts New Machines to Cut, Punch and Bend



Laser-punch combos seemed to be the star attractions at the booths of fabricating-equipment leaders at EuroBlech, including Trumpf, which introduced to the European marketplace the TruMatic 7000 (pictured). The machine comes in two sizes—2540 by 1280 mm and 2540 by 1570 mm—with as many as 22 tool stations in the linear magazine, and a 4000-W laser.

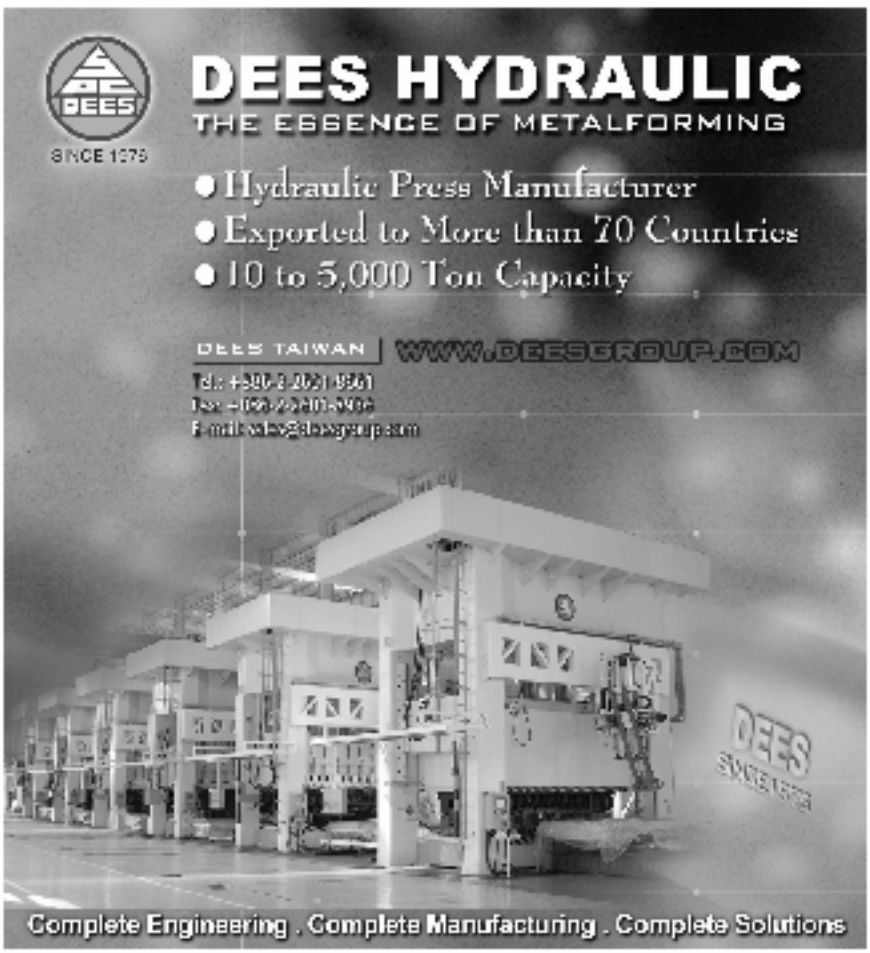
Due to a newly designed beam-guidance system, the TruMatic 7000 can process sheetmetal in a range of thicknesses using one cutting head. And, an automatic nozzle changer takes care of nozzle exchanges. Maximum sheet thickness: 8-mm mild and stainless steel, 4-mm aluminum.

Also anchoring the Trumpf booth was the TruLaser 3030 New, which also features automatic nozzle changing to minimize downtime. Fabricators can install a pallet changer perpendicular to the machine to minimize the overall footprint. And its 5-kW laser resonator has a standby mode that reduces power consumption to just 15 percent of the rated value.

www.us.trumpf.com

Editor's Note

Four full days walking the massive EuroBlech show yielded way too many technology highlights than can be described here. So, keep a look out for future issues of *MetalForming*, in which we'll present many more EuroBlech product introductions. In fact, turn to page 12 in this issue for some fastening- and assembly-related technology introductions we spied in Hanover last October.



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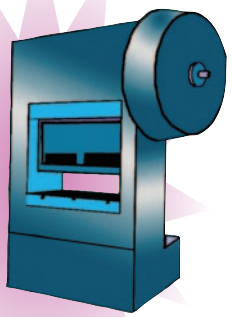
Hot *off the* Press



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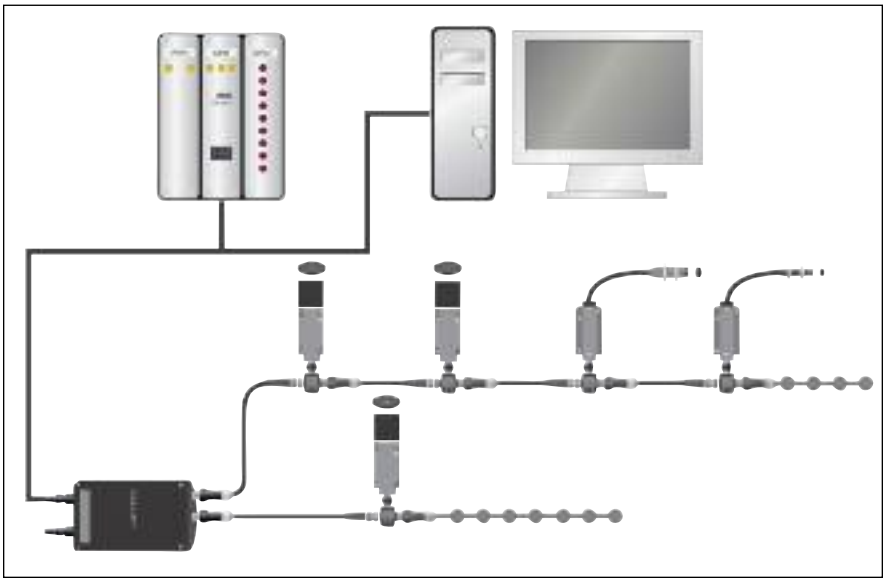
ToolingUpdate

RFID System Tracks Parts on Pallets, Totes or in Bins

Easy Loop read-only RFID systems from Balluff, Florence, KY, are designed to provide absolute data reliability and environmental ruggedness not found in barcode systems. With multiple versions of read-head hardware options, and read distances to 50 mm, ID values on Easy ID tags can be used to track the location of the part or



product bins and totes in and out of storage-and-retrieval systems or in production-line applications, providing high process visibility. Connecting and interfacing Easy Loop products is simple, according to company officials, with a single cable for power and communication and standard interfaces such as RS-232, RS-422 or even Ethernet TCP-IP.

By using the Easy Loop system in the manufacturing process, pallets carrying parts from one manufacturing or assembly station to the next can be tracked without the use of unreliable barcode methods, claim company officials. This allows error-proofing to be implemented in any production environment.

Reported benefits to using Easy Loop RFID include 100 percent data reliability; significantly increased visibility and process control; process error proofing; and reduction of mistakes and rework.

Balluff: 800/543-8390; www.balluff.com

Stamper Slashes Die-Change Times

BTD Manufacturing, Detroit Lakes, MN, has reduced die-change time at a two-press manufacturing cell from 15 to 3 min., thanks to the installation of magnetic die-clamping apparatus supplied by TCR Integrated Stamping Systems, Wisconsin Rapids, WI. The two-press cell makes a family of parts requiring rapid die changeover and short production runs.

TCR Inc., 800/676-2240; www.stampingsystems.com

New AutoForm Version Features Hydroforming-Tooling Enhancements

AutoForm Engineering Inc., USA, Troy, MI, announced the release of AutoForm software version 4.2. This version integrates process layout and tool-cost calculation into the AutoForm product suite.

A major new tooling feature centers around the hydroforming process with the definition of preforming tools. The concept significantly improves part quality, increases manufacturing efficiency and reduces tool wear, according to company officials. Other hydroforming enhancements in the new version include new

stage-concept definition. Increasing complex part geometries often requires the preform forming step after the bending and before the hydroforming process. Version 4.2 provides stage-concept definition for the hydroforming process starting from bending and preforming to hydroforming.

Other major enhancements in v4.2 include accurate OneStep-based flange development, more efficient springback compensation and import of various native CAD files.

AutoForm Engineering, Inc. USA: 888/428-8636; www.autoform.com

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Is Formability a Useful Term?

Formability is a simple word that means the ability to form (or deform) a material. While mainly applied to manufacturing metallic items, artists define formability as the ability to shape their medium before it hardens and is no longer workable. Many industries and hobbies liberally use the word formability. Unfortunately, the word formability is simple but the meaning is complex when applied to metalforming.

Formability has different interpretations depending on the circumstances in which the word is applied. Some examples are:

• Formability decreases as strength increases.

• If the part tears when made from aluminum-killed draw-quality steel, then substitute vacuum-degassed interstitial-free steel because it has more formability.

• Work hardening makes the material harder and less formable.

• Coil number 15 has more formability than coil number 27.

From these sentences, one might think there is a universal formability scale, where each coil or lift of blanks has a single numerical formability rating. The existence of such a rating system would make life easier for material producers, designers and users. Unfortunately, such a magic number exists only in dreams.

Each coil has a special chemistry consisting of a base metal with varying amounts of alloying elements plus other elements to create desired properties for specific applications. The coil may receive different processing, such as vacuum degassing, hot rolling, cold rolling, annealing, coating, temper rolling and other processes to further develop a product that meets customer needs. Formability of each coil can be different from other coils.

Unfortunately, the four sentences above present formability simply as a characteristic of the material. Instead, formability is the result of a complex and interactive system of inputs. Fig. 1 shows six major input groups, each with many sub-variables. The sheetmetal is only one input that determines formability. The other five inputs to the forming system usually make a greater contribution to the formability. For example, a common problem occurs when a successful forming operation transfers from the home press line to a backup press line. The die, sheetmetal, lubricant and even operator can be the

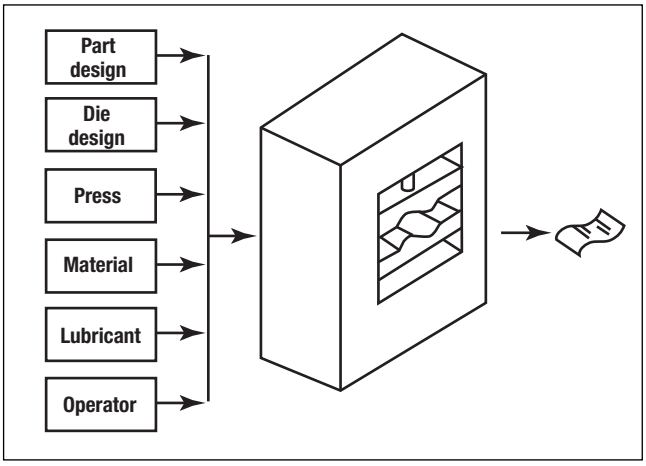

Fig. 1—Each of the six general categories of metalforming input variables contains about 10 sub-level inputs. The output (part) is an interaction of all input variables.

Stuart Keeler (Keeler Technologies LLC) is best known worldwide for his discovery of forming limit diagrams, development of circle grid analysis and implementation of other press shop analysis tools. Stuart's sheetmetal forming experience includes 24 years at National Steel Corporation and 12 years at The Budd Company Technical Center, enabling him to bring a very diverse background to this column and the many seminars he teaches for PMA. His most recent project is Technical Editor of the AHSS Application Guidelines–Version 4, which will be available for free downloading from www.worldutosteel.org early in 2009.

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Stuart Keeler's next seminar is "Higher Strength Steels—Solving the Problems," scheduled for April 15 in Chicago, IL. Check www.metalforming.com for this and other seminars.

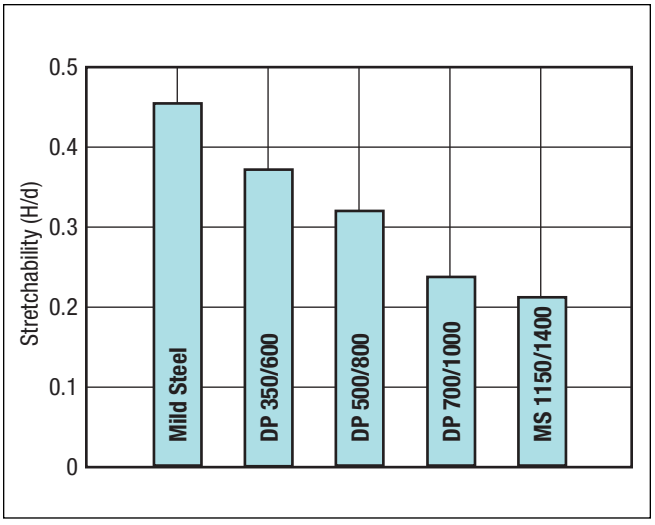

Fig. 2—Steel stretchability as measured by dome height decreases with increasing yield strengths. *Courtesy of IISI AHSS Application Guidelines–Version 3.*

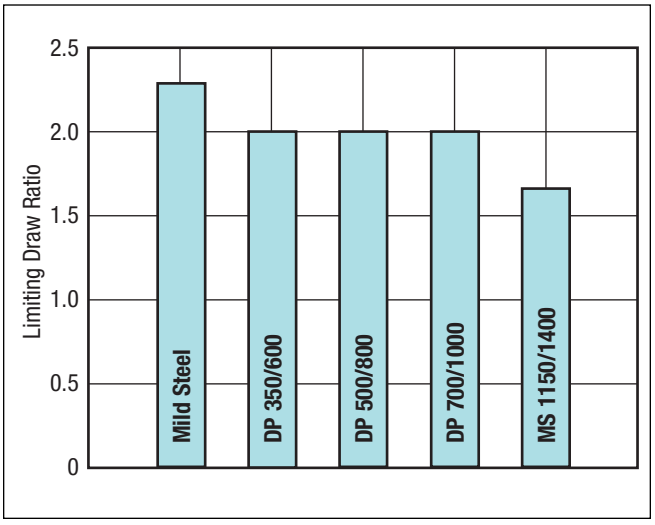

Fig. 3—Same steels shown in Fig. 2 tested in cylindrical cup drawing. The DP steels have a constant LDR of 2.0 over a doubling of the yield strength. *Courtesy of IISI AHSS Application Guidelines–Version 3.*

same, but the part now fails. The different press characteristics have changed the formability of the entire system.

Making the problem even more complex, different properties of the sheetmetal are important for different forming modes. For stretchability, the strain hardening of the material is extremely important. The greater the strain-hardening capacity of the sheetmetal (as measured by the work hardening exponent or n-value), the more it can be stretched in one or both surface directions. The higher the n-value, the greater the maximum allowable stretch at failure as defined by the forming limit curve and the reduction in localized strain gradients. Fig. 2 shows a steady reduction in stretchability as the yield strength increases from 25-ksi (175 MPa) mild steel to 150-ksi (1050 MPa) martensitic steel.

Immediately, one is tempted to believe that the first statement above is correct—that formability decreases with increasing strength. However, the correct statement is that stretchability decreases with increasing strength. Stretchability is only one mode of forming and formability. Forming a cylindrical cup is a drawing (radial drawing, deep drawing) mode of deformation. Unlike stretching which is a tensile mode of deformation, cup drawing is a compressive mode. Sheetmetal fails in tension, not compression. Fig. 3 shows the change in the Limiting Drawing Ratio (LDR)—maximum blank diameter without failure divided by punch diameter—for the five steels. All three dual phase (DP) steels have a constant 2.0 LDR. The mild steel has a 15-percent increase over the 2.0 LDR, while the martensitic steel (MS) has 15-percent decrease below the 2.0 LDR. Cup drawing is relatively insensitive to material strength over the large range of yield strengths shown in Fig. 3.

An interesting example of deep draw formability is the early two-piece steel beer can. The first press contains a die to create a cup. In the second press the die combines redraw, three ironing stages and bottom dome forming in one stroke. The steel grade for the beer cans is DR-9. After final annealing, an additional cold reduction reduces the thickness of the DR-9 grade by another 35 percent. This makes the steel blank thinner and full hard. The blank would have very little stretchability.

Several studies show a relationship between three-point air bending and total elongation. Therefore, the same sheetmetal blank (with one set of properties) has different formability depending on the forming mode. Within each forming mode, a change in part design, die design, lubrication, press and even operator will further change the formability of that blank.

Descriptive words such as formability, wearability, weldability, storageability, and other similar terms are like the terms steel, aluminum, copper, and titanium. These are very broad terms that provide only a hint about the topic under discussion. These terms have no meaningful numerical data to assist in die tryout, troubleshooting, problem tracking, or other press-shop needs. "Send me steel with good formability" accomplishes nothing. **MF**

THE SCIENCE OF FORMING, Vols. 1 and 2


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Gas-Spring Octet

Connected Without Hoses or Fittings

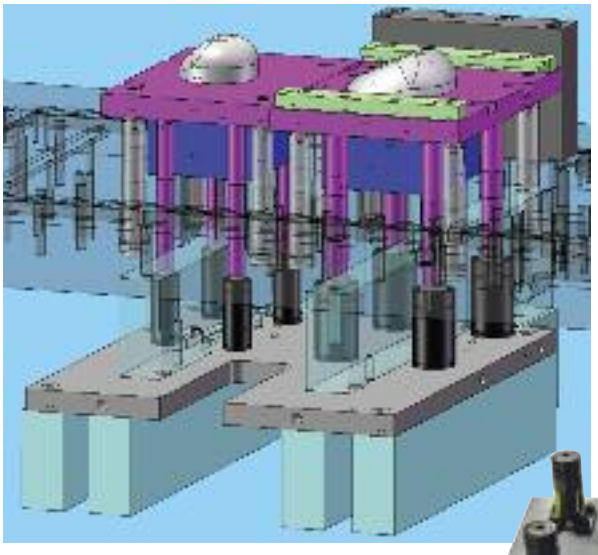
A predrilled base plate allows connection of eight nitrogen-gas springs without using hoses or fittings. The setup, for predrawing automotive spring seats, also allows the stamper to adjust gas pressure during setup and production to optimize quality.

BY BRAD F. KUVIN, EDITOR

Progressive-die designer and builder Performance Tool & Die committed three years ago to 3D designs, to keep up with market demand for increased part complexity, according to engineering manager Ron Barnes. And the move has paid off.

"We've been busy and have experienced steady growth since," Barnes says, noting that the company's sales grew from $5.4 million in 2007 to $6 million in 2008. "We've positioned the company to handle the most complex types of parts, for new programs or for aftermarket," adds Barnes. "In particular, we work on a lot of parts with complex contours and irregular forms. It's one reason we've stayed busy."

A recent example he cites: a 17-station die for manufacturing automotive spring seats. "The die has two draw stations," explains Barnes. "The customer wanted the ability to gather material prior to the main form station, to help avoid the potential for tearing the steel during final drawing. Also, for this predraw station the customer wanted the ability to adjust pad pressure, which required that we plumb the gas springs in that station together. So we evaluated possible solutions, hoping, in addition to offering the customer its desire for flexibility, to also design a neat, easy to install and maintain die section with the least likelihood for pressure leaks."

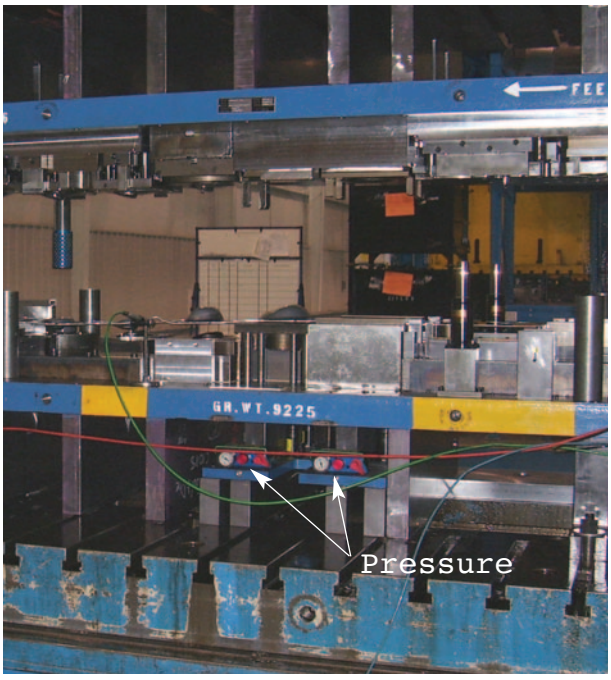


Performance Tool & Die designed this complete nitrogen package for a recent 17-station progressive die built for an automotive customer. The setup, built using the Dadco SMS-i system, features eight nitrogen-gas springs mounted to a common base plate that occupies two of the 17 stations. A series of passages drilled into the plate connect the springs.

No Hoses, No Fittings Needed

Performance Tool & Die operates out of a 26,000-sq.-ft. shop in Lakeville, MN, staffed with six designers and 10 toolmakers. Its equipment list includes six CNC machining centers and three wire-EDM machines, as well as six tryout presses from 150 to 600 tons. When I spoke with Barnes, the shop had work in various stages of completion—from design to tryout—for 37 different parts.

For the spring-seat application, Barnes and his team designed and developed, along with the help of an engineering team from nitrogen-spring manufacturer Dadco, Plymouth, MI, a base plate encompassing two die stations with a set of nitrogen-gas cylinders mounted to it. The package—designed using the Dadco SMS-i (Sectional Mounting System–Internal) system—calls for connecting a set of springs by drilling passages throughout the base plate. It avoids the need for external hoses and fittings, and



The SMS-i system mounts underneath the die and, thanks to the easily accessible pressure gauges and regulators, enables the end user to monitor and adjust pressure as needed across the system.

results in an inexpensive setup that is relatively simple to install and maintain, says Barnes.

"The base plate mounts under the die on the carrier plate, down by the risers," he explains. "Pins extend from the springs up through the die set to the pressure pads. Valves right in front on the bottom carrier plate of the die are easily accessed by the press operator or die setter to provide the level of control required by our customer."

Eight Gas Springs, Two Different Sizes

The SMS-i setup designed by Barnes and his team encompasses eight nitrogen-gas springs, all Dadco UltraForce high-force low-profile models. In the first of the two die stations covered by the SMS-i plate resides four heavier die springs—U.1200 models with 50-mm-dia. body and 1.2-ton pressure capacity. In the second die station sit four U.0400 UltraForce springs—32-mm-dia. body, 0.33-ton force capacity.

In addition to drilling out the base plate to connect the springs together, Dadco also installed two mini control panels and pressure regulators to allow the end user to monitor and vary gas pressure across the system. The gas springs attach through a bottom port, and the SMS-i allows for convenient filling and draining as needed.

"This setup beats the alternative," adds Barnes, "which would have been the use of a bunch of extra parts and hoses that could potentially leak. Instead we avoided having to design and build a complex plumbing system. It was fast to order, fast to build—Dadco delivered the package in two weeks after ordering—and saved us several hours at the design stage." **MF**

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Peter Ulintz has worked in the sheetmetal-forming industry since 1978. His background includes tool and die making, tool and process engineering, engineering management and product development. Peter also operates the website ToolingbyDesign.com, a source for the transfer of modern metalforming and tool-and-die technology, and which promotes the use of "Performance-Based Die Engineering Strategies."

Peter speaks at PMA seminars and roundtables focusing on tool and die design, die maintenance, deep drawing, stamping simulation, tooling for stamping high-strength steels and problem solving in the press shop.

Peter Ulintz

pete.ulintz@toolingbydesign.com

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More Energy, Less Tonnage

Last month, working-force and flywheel energy requirements were calculated for a blank-and-draw die to produce a 4-in.-dia. cup, drawn 2 in. deep. The blank was 8 in. in diameter and 0.080 in. thick with a tensile strength of 56,000 psi. The calculations yielded the following results:

Working force: 71.4 tons

Flywheel energy: 75.7 in.-tons

Many readers may be surprised to learn that a 110-ton press was selected over a 150-ton press because the lesser-tonnage machine had more flywheel energy operating at half the speed (strokes/min.) of the larger-tonnage machine. This month, press-selection criteria based on flywheel energy is examined in depth.

First, some key points to remember from last month's column: The tonnage rating of a press is the maximum load that can be exerted in continuous operation without causing damage to the machine structure or to its drive system. Available working force decreases in mechanical presses as the above-bottom-dead-center distance of the slide increases because the lever-arm angle—the relationship between the crankshaft angle and the pitman—has reduced mechanical advantage higher up in the stroke. The flywheel stores and delivers the required work energy while the electrical motor restores energy by maintaining flywheel speed and avoiding excessive slowdown. Flywheel energy is expressed in in.-tons of torque.

Table 1 lists four mechanical presses, specifying tonnage and energy capacity. Unfortunately, many stamping manufacturers do not include energy capacity in their press specification tables, even though the information is readily available in the press manufacturer's engineering specifications. The omission of energy capacities often leads to improper press selection, especially for deep drawing applications.

The primary differences between the mechanical presses in the table are the drive systems. Nongeared presses do not use any gear trains or gear reductions to transmit torque to the crankshaft. The electric motor has a pulley on the end of its shaft and V-belts connect the pulley to the flywheel. A clutch is positioned between the crankshaft and the flywheel so that the rotation of the crankshaft can start or stop as needed. The number of strokes/min. on non-geared presses are generally quite high in order to maintain flywheel energy.

Gear trains are used in mechanical presses intended for deep drawing

Tonnage	Drive System	Strokes/min.	In.-tons*
110-ton	Nongeared (flywheel)	80	50
110-ton	Single-geared	40	130
150-ton	Nongeared (flywheel)	80	70
150-ton	Single-geared	30	200

Table 1

** Check with the press manufacturer for specific values*

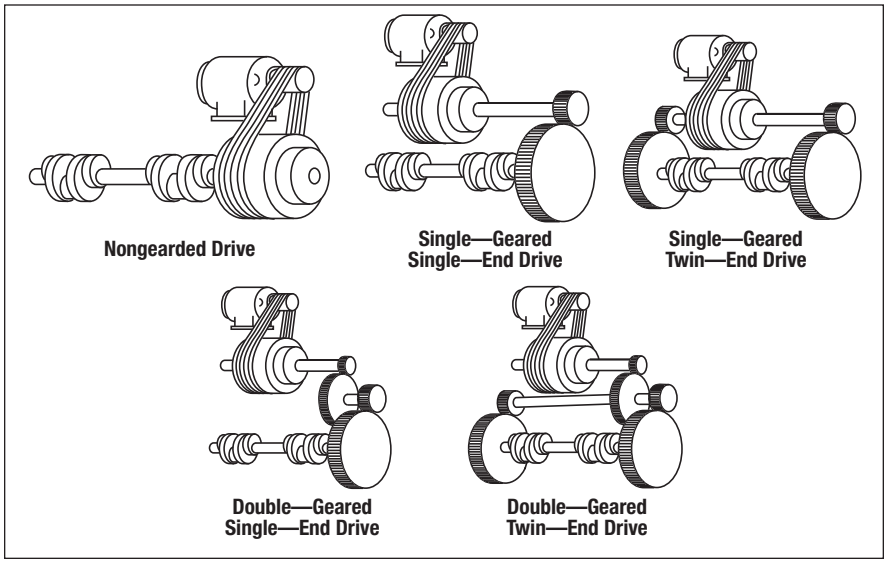


Fig. 1

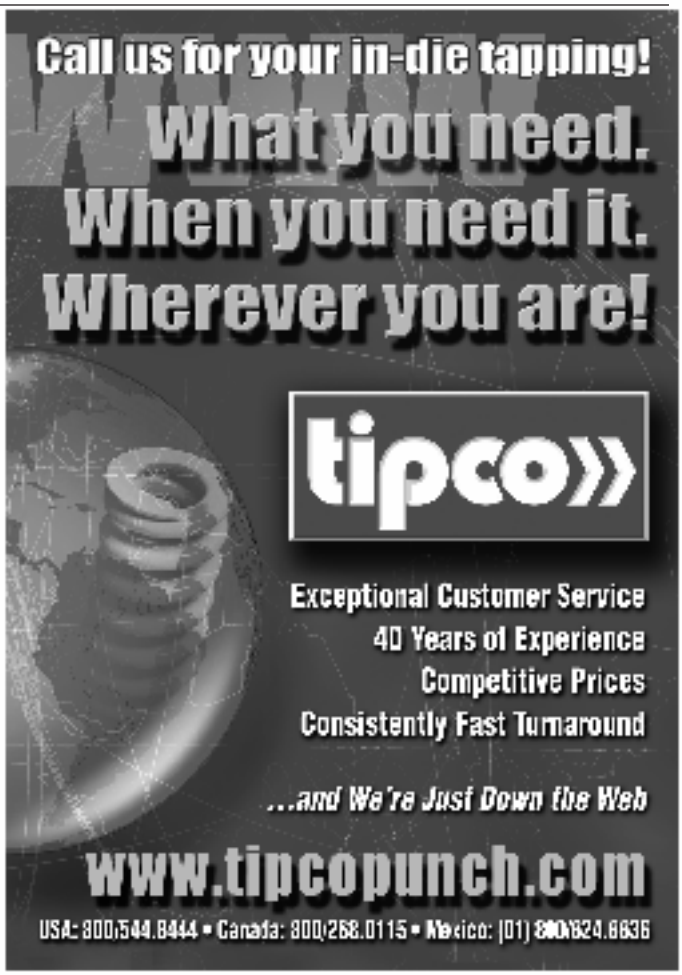
applications. The gear-train may be a single or twin-drive arrangement coupled with single or double-gear reductions (Fig. 1). By adding a single-reduction gear-train, an increase in mechanical advantage is achieved. Additional mechanical advantage is achieved with double-geared presses along with the possibility of longer strokes.

With identical number of flywheel revolutions-per-minute, the nongeared mechanical press will have the fastest ram speed (several hundred strokes/min.) with limited energy capacity. These machines perform quite well for blanking and forming operations and for many progressive-die applications due to the short working distances in the tooling.

Single- and double-geared mechanical presses are better choices for deep-drawing applications because slide travel can be slow enough for drawing while flywheel speeds and flywheel energy remain high enough to support the longer working distances. A double-geared arrangement will have the slowest speed (8 to 10 SPM) but the greatest energy capacity.

Now it should be clear why a mechanical press with lesser tonnage can have a greater energy capacity than another machine of greater tonnage. Even more so, it should be equally clear why flywheel energy specifications need to be part of your press specification lists and a primary consideration in any performance-based die engineering strategy. **MF**

write no. 31



write no. 32

PMA Committee Chairs Announced

At the recent PMA Annual Meeting, the association's board of directors elected chairs for its 2009 standing committees. Committee chairs facilitate committee meetings, drive agenda items, advance PMA's strategic plan and represent the interests of their peers.

The 2009 committee chairs are:

- Government Relations—Jim McGregor, Morgal Machine Tool Co., Inc.
- International—Bruce Walker, Walker Corp.
- Marketing and Sales—Dan Rader, ODM Tool & Manufacturing Co., Inc.
- Management Information—Jim Doyle, Rose City Mfg.
- METALFORM Conference—Mark Symonds, Plexus Systems
- Quality—Thad Reavill, Metcom, Inc.
- Safety and Environment—Mark Sutton
- Technical Seminar—James Meyers, D & H Industries, Inc.
- Training and Education—Reyna Dickensheets, Pridgeon & Clay.

Any person employed by a PMA member company may serve on a committee. Participation offers an outstanding opportunity to network with peers and develop leadership skills. For information about joining a PMA committee, contact Allison Grealis at 216/901-8800 or agrealis@pma.org

New Roundtables Scheduled for Early 2009

PMA is offering two new roundtables at the beginning of 2009 that address timely industry topics. On January 13, a Going Green to Make Green roundtable will focus on implementing green manufacturing initiatives and how they can improve the environment as well as boost your company's bottom line. Discussion topics include the cost of energy, justifying green instruments, reusable packaging, energy and power factors, green lubricants, green finishing and employee staffing efficiency.

On February 5, a Zero-Defect Stamping roundtable will focus on why metalforming processes are not zero-defect and how to address these issues to improve performance. Discussion topics include raw materials, material handling, process engineering, employee training, equipment selection, preventive-maintenance, tooling design, quality, cost drivers and post-process validation.

These are just two of the many roundtables that PMA offers. Others cover tool and die technology, CFO issues, IT topics, human resource issues, marketing and sales, safety and quality. For more information, contact Michelle Underwood or Deanna Cunningham at 216/901-8800.

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MetalForming:JOBS

PMA/NTMA Hold Third Joint Purchasing Fair

PMA successfully cosponsored the third annual joint Purchasing Fair with the National Tooling and Machining Association on October 10 in Lost Pines, TX. The event attracted 190 attendees and 35 purchasing companies looking to source and subcontract. Of those attending, 80 percent were looking for stamped, fabricated and formed metal parts.

The fall 2009 Purchasing Fair is scheduled for Indianapolis, IN, on Tuesday, October 6, at the Westin Indianapolis Hotel. To find out more information about this excellent opportunity for identifying new customers and finding new business, contact Allison Grealis at 216/901-8800 or agrealis@pma.org.

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January 29, Chicago, IL

ROUNDTABLE: ZERO DEFECT STAMPING
February 5, Cleveland, OH

DIE MAINTENANCE & TROUBLESHOOTING
February 12, Atlanta, GA

WELDING 101
February 19, Cleveland, OH

OSHA COMPLIANCE
February 25, Knoxville, TN

For more information or questions about seminars, contact Michelle Underwood, munderwood@pma.org at 216/901-8800, or visit www.pma.org/seminars.

write no. 35

Outstanding Error-Proofing at Pridgeon & Clay

George Keremedjiev has been writing this column for more than 20 years. He regularly consults with metalforming companies worldwide and provides metalformers with training on the application and implementation of sensors for die protection. For more information on his seminars and consultancies, contact:

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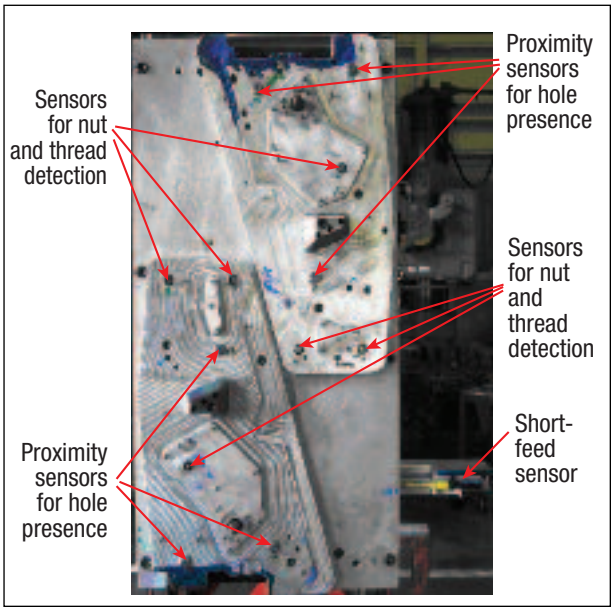
This CD-ROM presents dozens of George's columns as well as papers and exclusive new presentations covering all aspects of die protection and part-quality inspection, starting and maintaining sensor programs, the role of controls in in-die sensing, and the benefits of a sound sensor program. Order it online at www.metalformingmagazine.com.

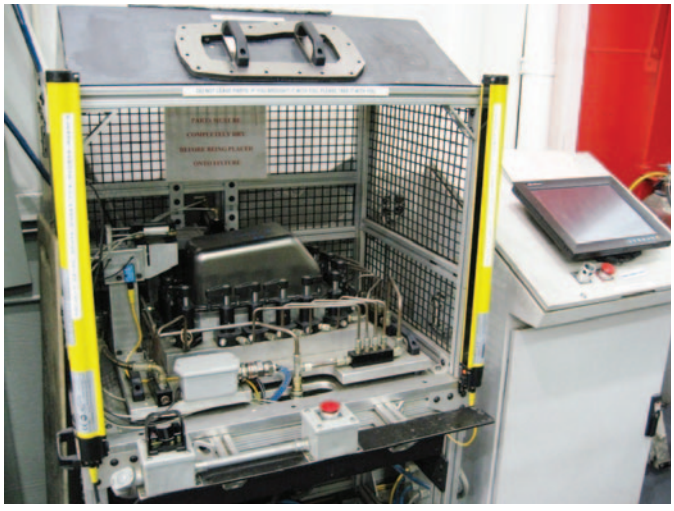
Currently celebrating its 60th anniversary, Pridgeon & Clay, headquartered in Grand Rapids, MI, was launched by John Pridgeon and Donald V. Clay in a small converted garage. Under the current ownership of Donald V. Clay's two sons, Donald C. Clay and Robert E. Clay, the company has grown into an international manufacturing showcase with facilities in several locations including Franklin, IN, and Apostag, Hungary. As it became one of the largest independent, value-added manufacturers and suppliers of stamped and fineblanked components and assemblies for the automotive industry, Pridgeon & Clay's management, including Ross Martin, vice president of International Operations, committed to a full-time professional error-proofing program with a fully staffed error-proofing laboratory.

A few years ago, Jim Taylor was selected to launch the program and currently is the error-proofing-lab team leader. Taylor, a journeyman die maker who has been with Pridgeon & Clay for 22 years, accepted the challenge of developing and implementing error-proofing technologies across the manufacturing floor. The goal was to reduce the number of manufacturing steps required to produce a quality product while implementing a serious error-proofing set of technologies within the stamping and assembly areas of the company. The program began with a serious die-protection phase and has morphed into an aggressive and effective part-quality-monitoring stage.

To make the advances possible, in late 2005 the lab was assigned an assistant, Tim Ray, a toolroom die technician. Ray has mastered the die-protection aspects of the program and trains all shop floor personnel who will have contact with the sensors. His training includes a three-week course that each of the die technicians in the toolroom must attend. To further complement the team, Brent Sawdy, a controls technician, was assigned to the lab. Sawdy has mastered the application of LabView software for data collection from the measurement sensors used in-die and in offline quality-inspection devices developed and built by the lab.

A solid example of the technical and managerial teamwork that abounds





within Pridgeon & Clay is the development of an inline inspection station that was added to a two-out progressive die stamping door panels. With left and right panels exiting the die, human inspectors had to check offline for hole, nut and thread presence at a rate of 100 percent. The cost for this human-based quality-verification process amounted to $45,000 per year.

There had to be a better way. The three members of the error-proofing lab along with key production, engineering and tooling personnel developed and built a separate additional section mounted adjacent to the end of the door panel die and bolted to the bolster. After the parts are cut off, they are transferred from the cutoff station to the inspection station using a clever adaptation of the press transfer system with shortened transfer rails and grippers.

To stand in front of this panel-stamping process and watch every single part automatically checked brings smiles to the management of Pridgeon & Clay, their customers and to the team members who worked with the error-proofing lab to make this possible, including Scott Visser, Dennis Myers, Jason Boersma, Ed Brown and Bruce Wollen. The parts now are 100 percent inspected for pierced holes, and and nut and thread presence. Should one or more of these features be absent, the process stops and the bad part is prevented from entering the part-out conveyor.

A second example of the application of sophisticated error-proofing techniques is the offline oil-pan flatness-checking fixture. This gauge clamps the oil pan at 16 points with a predetermined torque that simulates mounting on a vehicle. After clamping, 16 separate analog (measuring) sensors take the gasket-area flatness readings. A PC running LabView software gathers these readings and within seconds lets the operator know if the part is good or bad. The computer stores the actual measurements for traceability and further statistical and tooling correlation studies. The operator needs only to place the pan in the fixture and push one button—the rest of the process is fully automated.

The unwavering support from management for such projects infuses the whole company with the seriousness that these gauges deserve. From the operator to the owners of the company, the strategic value of error-proofing has been accepted as a necessary competitive advantage during both good and difficult economic times. What company can afford and justify the time and massive sums of money to manually perform inspections? Pridgeon & Clay has developed a better way. **MF**

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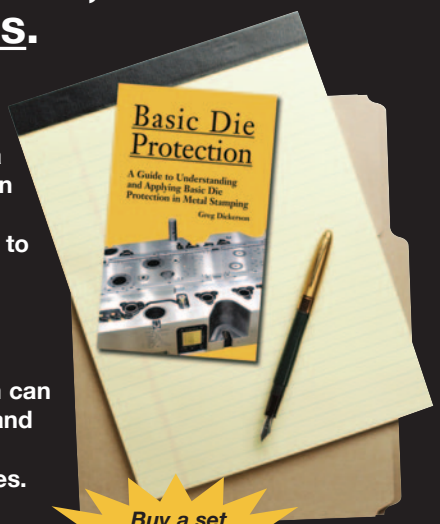

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Do You Want Your Business to Continue?

Irv Blackman, CPA and lawyer, is a retired founding partner of Blackman Kallick Bartelstein, LLP and chairman emeritus of the New Century Bank (both in Chicago). Want to consult? Need a second opinion? Contact Irv:

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Most successful business owners have two loves in their life: their family and their business. With rare exceptions, it's family first.

But what about the business? I've asked this question hundreds of times to the Joes of the business world: "Do you want your business to continue?"

A loud 'Yes' is always the answer. The longer Joe has been in business and the more success the business has enjoyed, the louder and more passionate the 'Yes'. Yet, Joe is troubled.

What's Joe's problem? Simply put, he has a succession-plan problem. After my 45 years of experience, it is clear that all long-term successful business owners have basically the same succession problems. But Joe doesn't realize it, because he thinks that his problems are unique. Let's start by spelling out the three most common succession-plan problems Joe usually has, all of which seem to him to be unsolvable:

1) How do I sell/transfer my business to my business kid(s) without getting killed by taxes?

2) How do I treat the nonbusiness kid(s) fairly?

3) How do I sell my business to my key employee(s) when they have no money? This problem arises when Joe has no child—or other relative—to take over the business.

Let's use a real-life example. Joe, a reader from Kansas, is the poster-boy of a successful business owner of his generation. Started from scratch. Built a successful business, Success Co., and wants to transfer it to Sam, his son. Joe married Mary right after high school. Both are 68. Joe works hard and plays hard. He's rich, but doesn't feel rich. In general, he's a happy camper, but his complete package (estate/wealth-transfer plan/succession plan) is a disaster. Mary knew it and prevailed upon Joe to call me.

Joe had five types of assets:

1) Success Co., $6.5 million;

2) A residence worth $700,000;

3) Rollover IRA, $900,000;

4) Other assets, mostly real estate and liquid investments, $3.5 million; and

5) Life insurance on Joe, death benefit of $800,000.

For estate-tax purposes, if Joe died and his wife Mary predeceased him, his estate would be worth $12.4 million. (Note: Joe is no longer insurable; Mary is.) Taxes at Joe's death, using his present wealth-transfer plan and 2011 tax rates would be about $5.5 million.

What are Joe's goals?

1) "Want Mary and I to maintain our lifestyle for as long as we live;"

2) "Transfer Success Co. to my son Sam, paying the least amount of tax, as soon as possible, yet I want to control it for as long as I live;"

3) "Have each of my two daughters (not in the business) receive an equal amount of our estate, the same as Sam receives;" and

4) Then Joe, with an I-know-it-can't-be-done laugh, asked, "Irv, can you get all of my assets to my family with no reduction for taxes?"

The first step, requiring five strategies, was to reduce the value of Joe's assets for estate-tax purposes, yet keep him in control. Without covering every detail and nuance of the plan, this is what we did on an asset by-asset basis:

1) Sold Success Co. to an intentionally defective trust (IDT)—only the nonvoting stock (which we created) was sold, while Joe kept all the voting

stock, so he kept absolute control. The IDT is a magnificent strategy that allows us to transfer a family business to any person tax-free;

2) Transferred his residence to a qualified personal residence trust;

3) Developed a profit-sharing plan (a magic bullet, which is discussed later);

4) Transferred all other assets—the real estate and liquid assets—to a family limited partnership; and

5) Transferred the life insurance to an irrevocable life insurance trust (ILIT).

These strategies lowered the total value of the five assets for estate tax purpose to about $6.5 million. We used up almost all of Joe's and Mary's unified credits ($1 million tax-free for each) in the process, leaving a potential tax liability, when Joe and Mary both die, of about $3.2 million.

Since we already have $900,000 of potential insurance proceeds parked in the ILIT, we need only about $2.3 million more of tax-free wealth to transfer all of Joe's assets to his family, with all taxes paid in full, and accomplish Joe's fourth goal. What to do? Joe was not insurable.

Here comes the second and final step. We decided to buy a $3 million second-to-die life insurance policy on Joe and Mary, using a subtrust as part of the profit-sharing plan. When both Joe and Mary pass on, the $3 million will go to Joe's family—free of the estate tax—to pay any estate tax liability that may be due. Every one of Joe's objectives will be accomplished and his entire lifetime wealth (more than $12 million) will go to his family with all taxes paid in full.

Although Joe was not insurable, my insurance consultant persisted with the insurance company and convinced it to accept Joe for second-to-die coverage (the full $3 million) with Mary.

And finally, assume that Joe has no kids in the business, but has a key employee—Ken, a smart, young guy who, as a practical matter, has really been running Success Co. for the past eight years. Just substitute Ken for Sam in the above plan. Joe's results would be the same. In addition, we would add a wage-continuation plan for Joe, to take effect if he ever quit working or could no longer work. This plan would continue for as long as Joe lived and at his death for as long as Mary lived.

If your succession-plan problems are the same or similar to Joe's, the above plan should be a starting roadmap of how to put in your own plan. If you have questions, just call me (847/674-5295). You are welcome to have your professional advisor on the line. **MF**

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MetalForming Magazine Xtra Newsletter

Let's Take a Break—Do We Have To?

Doug Ehlke, a national board-certified civil trial lawyer, has for more than 20 years represented metalforming companies in OSHA litigation and in labor-union elections. His law practice emphasizes labor law, personal injury, product liablity, probate, estate planning and environmental and employment discrimination law.

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Do employers have to force employees to take workplace rest breaks? Even though state agencies can impose penalties for employers failing to provide lunch and rest breaks, California and Oregon civil courts say no in overtime-pay civil-liability cases.

In the California case, *Brinker Restaurant Corp., et al. vs. The Superior Court of San Diego County*, 165 Ca., App. 4th 25, a group of servers brought a class action against the operator of 137 restaurants alleging violations of that state's meal-and-break workplace requirements. The employer allowed servers to take breaks in the first hour of an 8-hr. shift. The servers contended that the company was required to provide a second meal period within 5 hr. of that initial break.

The California Wage Orders contain two pertinent mandates on employers. Employers must:

1) Provide rest periods for every 4 hr. or major fraction thereof worked per day to non-exempt employees; and

2) Provide meal periods for days on which non-exempt employees worked in excess of 5 hr., and to provide second meal periods for days employees worked in excess of 10 hr.

The servers claimed that their employer engaged in unlawful "early lunching" by requiring them to take their meal periods soon after they arrived, usually within the first hour, and then requiring them to work in excess of 5 hr., and sometimes more than 9 hr. straight, without an additional meal period. The servers sought overtime pay for these alleged wage-law violations and other statutory relief.

The trial and appellate courts both examined the company's policies.

Rest-break and meal-period policy—Brinker's written policy provided that with regard to meal breaks, in a form to be signed by the employee, "I am entitled to a 30-min. meal period when I work a shift that is more than 5 hr." The form also provides, as to rest breaks, "If I work more than 3.5 hr. during my shift, I understand that I am eligible for a 10-min. rest break for each four hours that I work." The policy also provides that an employee's failure to follow the foregoing policies "may result in disciplinary action up to and including termination."

Working-off-the-clock policy—Brinker's hourly employee handbook states: "It is your responsibility to clock in and out for every shift you work. You may not begin working until you have clocked in. Working 'off the clock', for any reason is considered a violation of company policy." It also states, "If you forget to clock in or out, or if you believe that your times records are not accurate, you must notify a manager immediately, so that the time can be accurately recorded for payroll purposes."

Employer's Defense Contentions—Brinker argued that a rest-break class should not be certified because:

1) Under California Wage Order No. 5, paid rest breaks need only be permitted, not necessarily taken;

2) Brinker permitted its employees to take rest breaks;

3) Whether employees took the rest breaks Brinker provided required a "hopelessly individualized" inquiry; and

4) Individual issues thus predominated.

Brinker also argued that a meal period class should not be certified because:

1) Under the Wage Order, unpaid meal periods need only be provided, not necessarily taken;

2) Plaintiffs' "rolling, 5-hr. approach to meal periods," which "would call for a second meal period for work days with fewer than 10 hr. unless the first meal is taken exactly mid-shift," was wrong because "under the language of the Wage Order, an employee working more than 5 hr., but fewer than 10, is entitled to one 30-min. meal period at some point during the work day," and the law on its face called for a second meal period only when more than 10 hr. are worked";

3) Brinker provided all required meal periods to its employees;

4) Whether each employee was provided with meal periods as required by law "varied person-by-person, shift-by-shift, and day-by-day, and involved hundreds of individualized inquires"; and

5) Individual issues thus predominated over class-action issues.

Court Rulings—The trial court granted class status; however, in vacating that status, the California appeals court held that, while employers cannot impede, discourage or dissuade employees from taking meal periods or breaks, they only need to provide them the opportunity and don't have to ensure that they are taken.

The appeals court also overturned the trial court's conclusion that Brinker was required to provide breaks on a "rolling" 5-hr. schedule. By California law, a second meal break only is required when an employee works more than 10 hr.

Oregon's State Supreme Court in *Gafur, et al. vs. Legacy Good Samaritan Hospital, et al.*, 186 P.3d 446 (May 15, 2008), ruled against hospital employees who brought a class-action suit against the Portland-based facility for wages owed them. The plaintiffs claimed Legacy violated the rules of Oregon's Bureau of Labor and Industries (BOLI agency) by failing to grant them a paid 10-min. rest break every 4 hr. of work. Even though the BOLI agency has authority to issue a civil penalty against Oregon employers who willfully violate rest-period rules, in this civil-liability overtime-pay case, the Oregon Supreme Court ruled that:

- Employees, who were not provided rest breaks during a 4-hr. shift but were paid for 4 hr. of work, were not paid less than what they were entitled to and could not pursue a wage claim;
- Employees who take a rest break do not stop working for wage and hour purposes; and
- Nothing in the rest-period rule requires additional wages for missed rest breaks. **MF**

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Drew Stevens
Drew Stevens has been providing sensor-based error-proofing solutions to manufacturers for nearly 10 years. He also is a journeyman diemaker and author of the book Die Protection for Lean Manufacturing. In his role as a die-protection specialist, he develops specialized sensor-based die-protection training and application assistance to metalforming companies.

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New**Products**

Polyethylene Storage and Dispensing Systems, Mobile Lubrication Carts

The Innovative Fluid Handling (IFH) Group, Rock Falls, IL, has introduced a range of custom storage and dispensing systems and mobile lubrication carts using the company's new lightweight, economical polyethylene containers.

The IFH storage and dispensing system provides an easier, safer and cleaner alternative to 55-gal. drums, while taking up less floor space. It is a superior alternative for handling lubricants and other fluids such as cutting oils, hydraulic fluids and engine oils, according to company officials.

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IFH's new polyethylene containers also are used in a range of custom mobile lubrication carts. Users can specify the number of containers and their capacity as well as a variety of options such as pumps, hoses, nozzles and different sizes of drip-pan cart bases.

IFH Group, Inc.: 800/435-7003; www.ifhgroup.com

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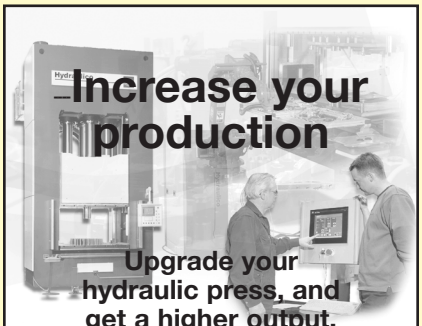

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"Is the economy as bad as all that? What can we do to persevere?"

BACKTALK LOUIS A. KREN

Dreaming of a Better 2009

Well, 2009 is here. For a thousand reasons I couldn't wait to see 2008 end, and I'm sure many of you feel the same way.

So what's in store for 2009? I was thinking about that the other night as I drifted off to sleep. I dreamt I was in Hell, locked in a room full of journalists. As I attempted to mingle, I spotted George Will holding court and speaking loudly, reading from his recent column.

"Sales the day after Thanksgiving (in 2008) were 3 percent higher than last year," I recall him saying. "Over the weekend, 172 million people, shopping in stores and online, spent an average of $372.57, a 7.2 percent increase over a year ago. Is this evidence that the recent deleveraging of indebted households has breathed fresh life into personal consumption, which normally is 70 percent of economic activity? Is it evidence of underestimated strength of an economy in which more than 93 percent of those who want to work are employed, and more than 93 percent of mortgages are being paid on time? Is it evidence that Washington's jaw-dropping interventions with hundreds of billions of dollars are having their intended psychotherapeutic effects? How much is it evidence of the decline of the price of a gallon of regular gasoline from $4.10 in July to $1.81 today? Over a year, every 1 cent decline is a $1.5 billion saving to consumers."

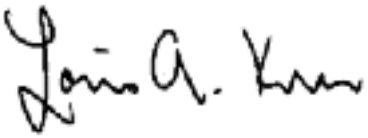
Good news? Is it possible? I wondered as I wandered over to the bar. Of course, this being Hell, the bar was out of everything. I opened the newspaper on the counter and couldn't believe the headline: Arena Football League to Postpone 2009 Season. More good news! I shared it with the guy who bellied up to the bar next to me. He introduced himself as Kirk Shinkle of *U.S. News and World Report*.

"The U.S. recession will be one of the deepest—if not the deepest—in the postwar period," he told me, quoting from his recent column listing the top 10 predictions for the global economy. "The current downturn is well on its way to becoming the longest in the past six decades. Based on the December IHS Global Insight baseline forecast for the U.S. economy, it will be the fourth deepest in the postwar period (the 1957 recession was the deepest, followed by the contractions of 1973-75 and 1981-82). Nevertheless, given the very negative tone of the incoming data, the recession could well be the worst in the postwar period. At the same time, the large back-to-back declines in real GDP predicted for the fourth quarter of 2008 and the first quarter of 2009 (down 5.0 and 3.8 percent, respectively) are the worst since the 1982 recession, and may easily be the worst in more than six decades. Overall, we expect the U.S. economy to shrink at least 1.8 percent in 2009."

Yikes. I was stunned. Is the economy as bad as all that? What can we do to persevere? Just then, a bright flash, followed by me sitting alone in a sun-splashed meadow. The weather was warm, and a light breeze rustled the tall grass. I thought about how nice life can be—health, happiness, friends, family. I thought about the circumstances that make us the lucky inhabitants of a great land. I thought about hope and perseverance—the seeds of success. I thought of the opportunities afforded us and how difficult times do not last forever.

I wondered where I was. A newspaper blew by, and I caught a glimpse of the headline: Arena Football League to Postpone 2009 Season. Yep. I was in Heaven.

Best wishes for a happy, healthy and successful 2009!



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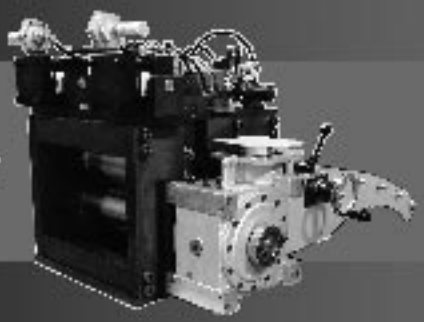

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