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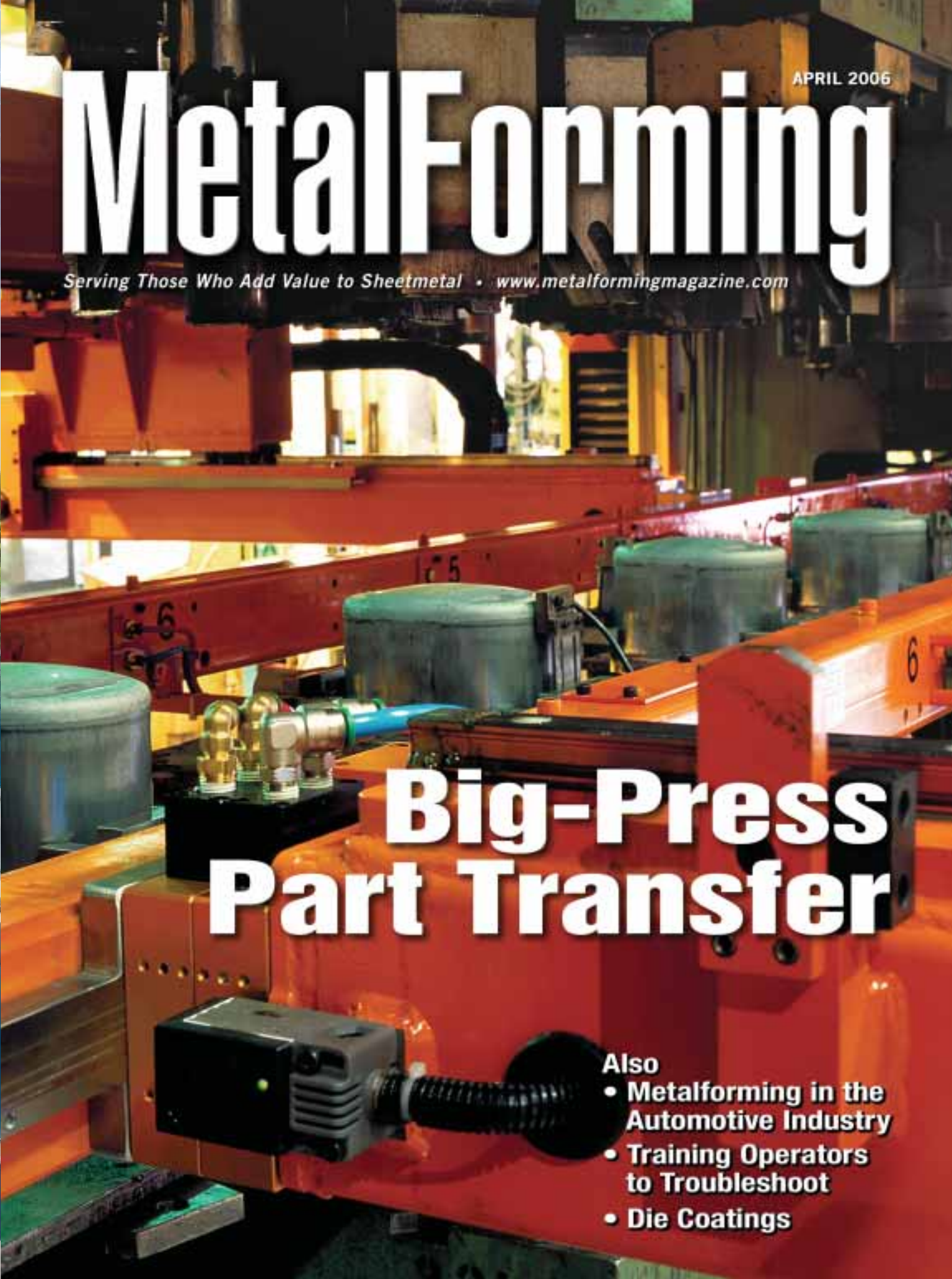

Big-Press Part Transfer

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Servo Transfer

Brings Big-Press Versatility

For years, a 1200-ton Verson stamped compressor housings for ICE Industries. Recently contracted appliance work demanded more from the press, and a new three-axis servo transfer system helped deliver the goods.

BY LOUIS A. KREN, SENIOR EDITOR

Since ICE Industries installed a Verson 1200-ton mechanical straight-side at its Acklin Stamping plant in Toledo, OH, in the 1970s, the press has spit out millions of deep-drawn compressor housings for the refrigeration market. But in recent years, part volumes have dropped to 300,000 annually, idling the press save for the single shift per day required to produce the housings via die-mounted three-axis transfers.

Cut to 2005, where ICE successfully quoted for production of oven parts for a major appliance OEM. To run the jobs on the large-bed (240-in.-wide by 54-in.-deep) press—eight part families using behemoth transfer dies with as many as nine stations—Acklin needed press flexibility. Fast forward to 2006, where a three-axis all-servo front-and-rear-mounted transfer system, from HMS Products, Troy, MI, teamed with new transfer, press and feed controls and improved in-press die fixturing, allows the plant to run the press two shifts daily to produce diverse part families in annual volumes north of 3 million.

A supplier to a variety of industries including refrigeration, appliance and automotive, ICE Industries and its three facilities, Acklin Stamping, Grenada Stamping and Assembly, Grenada, MS, and Deerfield Manufacturing, Mason, OH, seek diversity in products and processes as a hedge against domestic and foreign competition.

A walk through the ICE Acklin plant confirms that. The 80-plus-employee 170,000-sq.-ft. plant employs mechanical presses from 40 to 1200 tons, running single-operation, progressive and

This 1200-ton mechanical press, outfitted with a new three-axis servo transfer system, produces more than 3 million parts per year—in various sizes, draw depths and material thicknesses—at the ICE Acklin Stamping plant. Parts include refrigeration compressor housings, shown at left with other Acklin stamped parts attached, and a stove inner panel and control panel (right).

transfer tooling, some with in-die welding capability. The plant also performs secondary manual and robotic gas-metal-arc and projection welding, assembly and packaging.

Press Flexibility Needed

Since its install, the 1200-ton press has produced compressor housings from two die sets, in draw depths to 6 in. using draw-quality hot-rolled steel 0.125 in. and thicker. The original part-specific die-mounted three-axis servo transfer system (one for each of the compressor-part die sets) featured a set 24-in. pitch, 1-in. lift and finger travel of only about 6 in., according to Rodney Delong, director of process engineering for ICE Industries.

"We were constrained to that product line due to the functionality of the press," recalls Delong. "It was hard to set any other dies into the press, due to the die-mounted transfer system and also due to the inflexible die-mounting system on the press. Put it together and the press setup was not versatile enough

A new transfer system spans the 240-in.-long press bed and handles these thicker deep-drawn compressor housings as well as thinner, longer appliance parts. With the transfer came a new control package.

With 70 percent of the company's operations reachable by overhead crane, die storage was redesigned to afford better access from above. Now, large transfer dies—too heavy for forklifts—store in special open-top racks near the press, allowing for more rapid die removal and placement.

to easily take on different work, say a small one-die job or a low-volume run. Setup would take too long."

New Contract Spurs Upgrade

With compressor-part volume shrinking, the press increasingly sat idle, but a successful bid on production of stove parts, including control panels and oven inner doors, for a major OEM provided the impetus and cost-justification to upgrade the press' die- and part-handling capabilities.

"That press was locked into one product and we needed to unlock it," recalls Delong. "We looked at transfer systems that would give us that flexibility and opted for a three-axis all-servo model (HMS 900HD series). We also had to modify the press to make it more versatile, including removal of 20-year-old control technology."

Modifications included a new press control, courtesy of Toledo Integrated Systems, Holland, OH, and new servo-feed control, from Universal Controls Group, Perrysburg, OH.

Mid-June 2005, crews shut down the press to install the new transfer system, controls and tool fixturing on the press bed, allowing 2½ weeks before production on that press had to resume. Rewiring and control systems came first. Upon completion and testing, HMS performed the fixturing and weld-up, and installed the column-mounted transfer and related automation.

A core group of ICE employees, including Delong, serve as a launch team and travel to each plant as needed. Brought together at the ICE Acklin plant for this transfer project, the team worked closely with suppliers and part customers to marry controls and equipment, from feeder to press to transfer. In addition, the team closely followed the design and build of eight large transfer dies—purchased by the appliance OEM and built by a third party—to ensure that the tooling meshed with the new press setup.

Flexibility Needed for Diverse Part Families

Though the 240-in.-long press bed creates challenges for a front-and rear-

Transfer dies for the 1200-ton press are staged via one of two rolling bolsters, enabling 30 to 45-min. tool changeout between jobs.

mounted transfer, according to Pat Cullen, product manager for HMS Products, the company has supplied the 900HD transfer system on presses with bed lengths to 256 in., and this model is rated for bed lengths to 300 in. Maintaining rigidity across such a large span at the plant entailed a beefed-up primary structure and heavier guidance systems, motors and counterbalance systems, all tailored for large parts, high-tonnage presses, rapid accelerations and heavy weights.

"The existing compressor-housing product line needed minimal pitch travel to replicate the process," explains Cullen. "Given the 240-in. bolster length, and the desire to expand into appliance stamping, the new transfer system was configured to achieve 60 in. of pitch (x-axis) travel, 48 in. of lift (z-axis) capability and 36 in. of clamp (y-axis) travel, all freely programmable on a part-specific basis."

To continue running the existing tooling for deep-drawn parts in the new transfer setup, ICE officials opted for cost-effective one-finger part handling, designed for minimal changeover.

At ICE Acklin, the specified finger bars are rated to handle 400 lb. per side, with accelerations of 1.5 g in the x axis and 0.75 g in the y and z axes. Those specs surpass what is needed to produce the existing deep-drawn parts, and also match up with the requirements of the new appliance parts.

"The nine-station tools for the new stove parts are some of the most complex dies I have ever dealt with," says Delong, noting that some of the dies have as many as 3000 details. "They form and cut and incorporate all kinds of cams and lifts. It is one thing to make a part, but to lift it back up to the same exact spot and present it consistently to a transfer system is another challenge. That required a lot of upfront engineering and, using 3D CAD software and simulation to produce the tooling and transfer design, it has all worked out surprisingly well."

Thin, Soft Material Necessitates Learning Curve

The Class A drawn stove parts, control panels and inner doors, are of cold-rolled draw-quality steel in thicknesses of 0.26 to 0.38 in.

"This plant typically works with material 0.125 in. or thicker," says Delong, "and Class A parts while not new to ICE, were new to Acklin. This made the thinner, softer material more challenging to work with initially."

If all that weren't enough, the plant went from part lengths of 8 to 30 in. for the longest control-panel parts. Of course, thinner and longer parts tax transfer systems, presses and feeders, and ultimately can slow production. Not in this case, according to Delong.

"Bounce or movement in a transfer system, especially with longer, thinner parts, will limit stroke rate, but I've never seen a transfer system more rigid than this one," he says. Stove-part runs on the big press and new transfer system range from 8000 to 800,000 annually, at speeds from 15 to 19 strokes/min., ideal, according to Delong, especially when the press itself maxes out at 20 strokes/min.

To assist in Class A part production, the plant installed extra lighting around the press—an operator visually inspects each part for surface defects before another boxes it, right off of the press. And the feeder boasts new guides to handle the thinner material.

"The thicker material was simple to position and maintain coming off of the feeder," says Delong. "With 0.026-in.-thick material, we try to guide it and it just wants to wrinkle. So we redesigned the feed guides to accept this thinner material. Dealing with that and the fact that the material is softer—those were learning curves." **MF**