

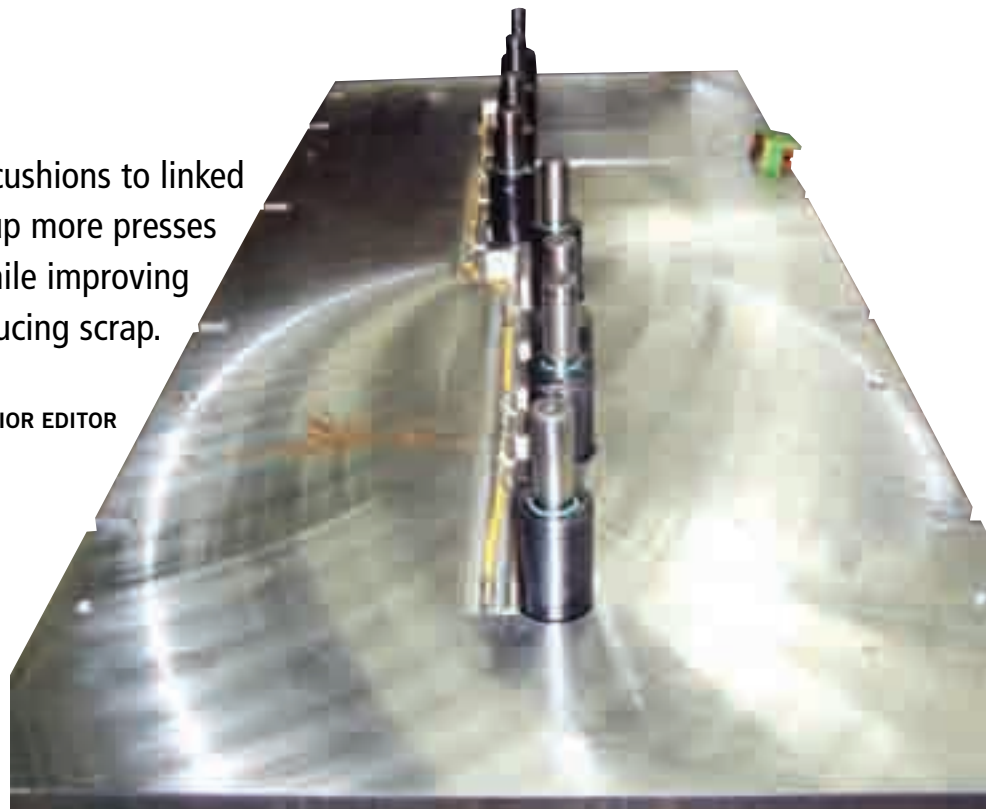
# Better Deep-Draw Control via Gas Springs

The switch from air cushions to linked systems has opened up more presses for deep-draw availability while improving forming consistency and reducing scrap.

BY LOUIS A. KREN, SENIOR EDITOR

Successful deep-drawn parts depend on exacting control of forming throughout the lengthy press stroke. Air cushions often are employed to do that, but can be limiting. Jobs requiring the use of air cushions obviously can run only in presses equipped with the cushions. That reduces flexibility in pressroom scheduling and often results in tooling employed in a less-than-optimal press for the job. That was the challenge presented at ICE Industries' Deerfield Manufacturing stamping plant, Mason, OH. A switch to linked nitrogen-gas-spring systems brought better forming control and less scrap, according to plant officials, and also opened up more of the plant's presses to accept deep-draw jobs.

Founded in 1948 as a screw-machine operation, Deerfield Manufacturing, with 145 employees across three shifts, now specializes in production—to the



Here's a nitrogen-gas-spring manifold system mounted on a base plate, for use on draw tooling at ICE Industries' Deerfield (OH) Manufacturing plant. The system, which travels with the tooling, replaces air cushions to provide pressure during the drawing process, giving Deerfield flexibility to run the jobs on different presses in its shop. The manifold systems employed at Deerfield, 10 thus far, have resulted in better forming control and less scrap, according to Travis Hearn, Deerfield general manager.

tune of 35,000 finished stamped parts per day—of primarily deep-draw automotive and compressor parts, including compressor housings for its largest customer. The majority of material, especially for the housings, is Type 1008 or

1010 hot-rolled steel, but the company is evolving into higher-strength material to make clutch parts for a new customer.

The 100,000-sq.-ft. manufacturing operation, acquired by ICE Industries in 2002, boasts 50 mechanical presses in

capacities from 150 to 1000 tons, and one hydraulic-press line. Deerfield is expanding its capabilities and capacity by adding a new tandem-line setup consisting of five presses from 500 to 900 tons. A fully stocked toolroom maintains, retrofits and repairs tooling.

### **Needed Flexibility in Press Lineup**

In 2005, Deerfield took over a job requiring a half-dozen transfer dies. Presses with large enough bed sizes to accommodate all of the tooling did not have air cushions, so the dies had to be split—running on two presses that did have the cushions but with smaller bed sizes.

“We wanted the flexibility to run these jobs, not necessarily on a press that used air cushions,” says Travis Hearn, Deerfield Manufacturing general manager.

To take advantage of its stable of presses, the company decided to outfit tooling with nitrogen-gas-spring link systems, featuring springs from Dadco, Inc., Plymouth, MI. In a linked system, gas springs are mounted onto a plate and piped using hose and fittings. A linked system allows users to monitor, charge and drain the springs from outside the die using a control panel.

“We were able to convert to nitrogen-gas-spring systems with those existing die sets to run in larger-bed presses,” says Hearn. “Those initial conversions brought flexibility to our press lineup in the shop, but since then we’ve cascaded conversions onto additional dies.”

Why? Hearn points to a reduction in variation in the deep-draw process due to using the linked-gas-spring system.

“The dies for these draw operations usually are built specific to the shop where they will be run and for a specific press,” he explains. “If the design for drawing is dictated by access to the air cushions in the press that the tooling was made for, and then the tooling is moved to a different source, like what we experienced when we took over the tooling, we might not be able to utilize the same drawing process. Though the

previous user had six air-cushion pins running on a draw die, we might not have access to six, we might only have access to three or four.”

That compromises draw consistency. And bent or otherwise damaged cushion pins can result in an unbalanced load as the other pins continue to function normally. All this points to an advantage of linked-gas-spring systems, according to Jason Vandine, Dadco engineer.

“With gas springs piped together, if one gas cylinder loses pressure, all the cylinders will lose an equal amount of pressure, eliminating an unbalanced situation that can damage tooling and the press,” he explains.

### **More Consistent Draw Process**

“With the Dadco nitrogen-gas-spring systems, we get a consistent draw process across that whole operation in the die,” says Hearn. “Our biggest gain from the switchover is the ability to control that form all the way through.”

Such consistency has brought a serious reduction in scrap and a corresponding reduction in changeover times.

“In one draw operation, we were running 15 to 20 percent scrap, and after converting to a linked-gas-spring system, we reduced it to less than two percent,” says Hearn. “Again, we attribute that to the gas springs providing a more consistent drawing operation.”

For the six dies originally converted, Dadco provided its 90.10 and 90.9 series of nitrogen-gas springs, with charging pressure ranges of 220 to 2175 psi and maximum speeds of 20 in./sec. For all of its conversions, 10 thus far, Deerfield also purchased hoses, fittings and control panels from Dadco and piped the systems inhouse. Converting to a nitrogen-gas-spring-linked system takes about two weeks, according to Hearn, though the most recent conversion was completed in less than 10 days as Deerfield flattens the learning curve.

“We learned a lot after the first two or three conversions,” he says, “so it is not a significant project for us anymore as far as engineering or build time.” **MF**