Operators Revel in Hydraulic-Press Controls Refresh

Noting that deep drawing in a hydraulic press is not a "set it and forget it" process, the crew at Toledo Metal Spinning celebrate the benefits of newly updated press controls—faster setups, improved reliability and safety, and the ability to make process adjustments on the fly.

BY BRAD F. KUVIN, EDITOR

Press controls running with obsolete HMI (human-machine interface) software that would only run on Windows NT created huge productivity hurdles at metalformer Toledo Metal Spinning Company (TMS, Toledo, OH). Only heroic efforts by the firm's IT technicians and press operators enabled it to continue to meet customer requirements, as hydraulic-press uptime suffered mightily due to control problems. We're talking monthly shutdowns, or even more frequently, due to glitches in press-control software and hardware experienced by the 1998-vintage presses—250- and 400-ton models.

"We were limping along," recalls TMS vice president Craig Fankhauser, harking back to 2007-2008. "Our technicians were spending a considerable amount of time troubleshooting those two presses, chasing control hardware and software issues. We had no computer-hardware support, and replacement circuit boards became very difficult to find. But while downtime events often would last several days, we always made delivery dates. But it was difficult and costly."

One-Piece Flow

TMS's two hydraulic presses work in production cells along with circle and square shears, plasma-cutting machines and deburring equipment. The firm moved to cellular manufacturing and one-piece flow, and away from batch manufacturing, when it retooled following a devastating fire in 1998. In addition to the hydraulic-press cells, its 100,000-sq.-ft. main production facility also features metal-spinning lathes, robotic welding and finishing cells, fabrication equipment and CNC machining centers.

TMS built its reputation on deep-drawing, spinning and fabricating stainless steel, and that remains a specialty of its 35-employee workforce. Some 65 percent of the material moving through the shop is stainless, primarily deep-draw-quality Type 304 from 24 to 4 gauge; the sweet spot, says Fankhauser, is 14 to 7 gauge. Press bed size measures 48 by 48 in.; draw capacity is approximately 14 in. The presses turn out shells, cans, tubes, hemispheres, hoppers, metal enclosures and pans.

"We're processing 200 to 300 jobs in the plant at any one time," he says, "in lot sizes of one to 10,000 typically. Most—80 percent or so—are repeat orders. Twenty percent of our work is for our standard product lines, such

Press operator Dan Tenney tends to the 400-ton hydraulic press at Toledo Metal Spinning, tooled for deep drawing a can. The press resides in a production cell along with plasma-cutting and deburring machines to facilitate one-piece flow.

Part of the control-retrofit project included outfitting each hydraulic press with a Siemens Panel PC running Siemens WinCC Flexible application software. Toledo Integrated customized the software to include enhanced operator-friendly screen layouts and diagnostics, to enable on-the-fly parameter adjustments during deep drawing.

as deep-drawn cups and pans, conical hoppers used by injection molders, and high-end heavy-duty trash receptacles for amusement parks, stadiums and other outdoor venues."

Lead times have shrunk dramatically in the last several months; Fankhauser shares, from 4 to 6 weeks down to as little as one to two weeks.

"Our approach to lean manufacturing, cellular manufacturing and one-piece flow has allowed us to absorb these recent lead-time challenges, as has the greatly improved reliability and uptime from our hydraulic presses," stresses Fankhauser.

Controls Resuscitation

Called on to rescue TMS from its press-control crisis and restore order to its lean processes: Toledo Integrated Systems, Toledo, OH. In 2010, Toledo Integrated replaced the existing operator screens and PLC controls on both of TMS's hydraulic presses, including all distributed I/O. Out with the old, in with the new—for starters, Toledo Integrated installed a Siemens S7-300F-series failsafe processor in each control in place of the existing redundant PLCs. Toledo Integrated product manager John Eby explains:

"While safe PLCs have been available for several years, we've not seen them implemented in pressrooms until recently, as their price has dropped significantly to make them more affordable for retrofit projects such as those at TMS. One safe processor can internally provide the same level of redundancy and safety as dual PLCs, providing a simpler and cleaner solution. There's less wiring, less cabinet space required and fewer maintenance concerns."

Out on the shop floor, we spoke with press operator Dan Tenney, a 29-yr. TMS veteran, about the new HMI interface—a 15-in. color-screen industrial PC loaded with software customized by Toledo Integrated to manage the complex and often finicky deep-draw process. Tenney and his fellow press operators now are called on, thanks to the move to cellular manufacturing, to run as many as five machines in a cell, not just the stamping press. "That's why the simpler, more efficient press control makes my job that much easier," says Tenney.

Among TMS's standard product lines are these heavy-duty waste receptacles, fabricated from 16-gauge stainless steel, shown here awaiting finishing in a robotic cell.

Customized Application Software

To breathe new life into the TMS hydraulic-press duo—and in fact take them to levels of productivity and reliability—Toledo Integrated outfitted each with a Siemens Panel PC running Siemens WinCC Flexible application software. Eby and his team customized the software to include all preexisting functions, along with enhanced operator-friendly screen layouts and diagnostics.

"The new touchscreen not only is user-friendly," Tenney says, "but now all of the job parameters are displayed on one screen—ram position, pressure, etc. Before, we had to click through several screens to obtain all of the data needed to monitor the process and make adjustments—and adjustments are a fact of life when deep drawing on a hydraulic press. It's not a set-it-and-forget-it process."

The presses each comprise four hydraulic cylinders—two downward acting and two upward acting. Tenney and his peers can program each cylinder independently with regard to speed, stroke length and force to adjust blankholder force and develop reverse-draw and redraw routines.

"Programming is remarkably faster and simpler," Tenney continues. "Programming a new job used to take, on average, 30 to 45 minutes. Now, with easier access to screens and data, and the ability to repurpose parameter recipes from previous jobs to plug into new programs, we can program new jobs in 15 min. or less. Then, as programs run inproduction, we can make adjustments on the fly, which we could not do before." **MF**