Improved Hydraulics

Manage Spring Force, Slash Cycle Time

New hydraulic-press technology allows Sensormatic to achieve near-perfect quality and slash cycle time by more than 50 percent on lines used to blank styrene-coated metallic security labels, 144 per press stroke.

BY BRAD F. KUVIN, EDITOR

Sensormatic manufacturing plants in Puerto Rico and China manufacture anti-theft labels by the billions. In the late 1990s, Sensormatic began replacing older hydraulic presses used to manufacture the labels with new presses designed to enhance throughput and quality. The labels are the kind you see affixed to any number of consumer items, and are used by leading retailers including Wal-Mart, Kroger, The Home Depot and CVS.

"The security labels are styrene-coated metallic tags," explains Bob Simone, Sensormatic lead engineer, label manufacturing support, who works closely with the two production facilities that manufacture the labels. "We take a metal-alloy sheet about 5-ft. square and add multiple layers of styrene laminate, then blank 144 labels from the sheet with one stroke in a hydraulic press. After the top die half breaks through the sheet, the process requires 16 tons of die-spring force to strip the punches. In the mid-1990s, we decided that the hydraulic circuitry on the presses could not adequately control this stripping action, leading to significant pad bounce.

"Also, the presses—120-ton C-frame models—were flexing enough under load that they would move out of tolerance," adds Simone. "Our punch tolerances are tight—0.0002 in.—so this flexion of the press frames caused premature die wear."

New Presses, Upgraded Hydraulic Circuitry

As a result of the presses' inability to manage the stripping

Sensormatic employs five of these Neff Model H40-3M 4-post hydraulic presses to blank styrene-coated metallic security tags, 144 at a time. Press bed size: 33 in. square, with 30 in. of daylight.

Sensormatic UltraMax anti-theft labels comprise a metal-alloy tab coated with multiple layers of styrene laminate. One stroke in a hydraulic press blanks 144 of the labels out of a large sheet.

force during press retract and to improve press rigidity, Simone ordered five new 120-ton C-frame presses from Neff Press, Inc., St. Louis, MO, with beefed-up frames that, according to Simone, immediately solved the flexion issue. To replace the last of its aging hydraulic presses, Simone opted for five 4-post presses that allowed him to reduce press tonnage to just 40 tons.

"We need only 5 to 7 tons of press force to punch the sheets, plus 16 to 18 tons of die-spring force for stripping," Simone says, "so the 40-ton 4-post presses work just fine."

At each of the two facilities manufacturing the security labels, Motoman six-axis material-handling robots load styrene-coated sheetmetal blanks, one robot serving each press. Underneath each blanking die feeds, left to right, a continuous roll of adhesive-backed liner, so that as the blanked labels fall from the sheet they adhere to the liner, which then rewinds at the opposite end of the press. The liner steps and repeats in registration with the press stroke, with a cycle time of 4.7 sec.

"When we approached Neff Press to help us upgrade production, we asked for a 5-sec. cycle time," recalls Simone, "quite a significant improvement from the 11-sec. cycle time we had been achieving. Eliminating the pad bounce, in addition to firming up the press structure, got us where we wanted to be, and beyond."

Better Control = Less (Zero) Scrap

Eliminating pad bounce from the 16-ton stripping force was achieved thanks to a dramatic upgrade in hydraulic circuitry, says Simone. "The original presses used fixed-displacement pumps and solenoid-operated valves," he says, which offered little process control. "The newer presses use variable-displacement pumps and proportional valves, which give us better control of all of the fluid in the presses.

"Neff designed a decompression hydraulic circuit and timing sequence specifically to handle the blanking load," adds Simone, "and the end result is that where we used to have to scrap an average of four to six labels per set of 144, we now achieve better than 99.9 percent quality from the press lines."

The Neff 4-post presses are H40-30M models with beds 33 in. left to right, 33 in. front to back and with 30 in. of daylight. A cutout in the bottom bolster of each press allows the positioning of a vision system used to inspect the security labels in-process. The power unit—motor and pump assembly—mount externally and upside down to provide full access to all four sides of each press, allowing Sensormatic to easily integrate the coil-feed system that delivers the adhesive-backed liner, as well as the robot, vision system and scrap-removal system.

Each press runs with a 12-in. stroke, 2 in. of work in 2.9 sec. And a 30-hp power unit generates ram speeds as high as 1200 in./min. **MF**