

Turret Tooling Takes a Chunk Out of Downtime

It's been nearly ten years since David E. Smith, a manufacturing engineer for Lennox Industries Inc., began working at the company's Stuttgart, AR, plant as a punch press operator. Today, Smith helps to direct sheet-metal fabricating in the 500,000 ft² (46,450 m²) facility. With more than 100 metal fabricating machines, including 30 punch presses, the Stuttgart plant is the primary production facility for Lennox's industrial cooling and heating division.

"Like any fabrication manufacturer, downtime hurts our bottom line," says Smith. "Green-light time on the machine is what helps us succeed. By staying ahead of the game, we can control our success factors."

One of the primary factors in avoiding downtime is finding the right punch-press tooling for each specific application. "Many factors affect overall productivity, but it is typically a tooling problem that results in downtime," says Smith. "Of course, tool performance and longevity are always issues. Fortunately, tool performance has consistently improved through the years. New coatings and improved tool steels have substantially increased overall tool life and quality."

Of the 30 punch-press machines operating in the Stuttgart plant, 10 are Murata Wiedemann turret presses. Until recently, few improvements had been made in tool change-out and adjustment of these punch presses. Average tool-change time could be more than 30 minutes. With three shifts running the 10 machines each day, downtime added up quickly.

In 2001, Wilson Tool (White Bear Lake, MN) developed a prototype tool that reduced downtime substantially. Although testing had been



done at the Wilson Tool Technology Center, field tests at a neutral beta site were needed, and Lennox agreed to let the Stuttgart plant serve as a beta test site.

Wilson Tool initially provided several new holders for a Murata Wiedemann Centrum-3000 punch press. The beta turret press would be used for a variety of sheetmetal applications, from pre-paint mullion posts to galvanized electrical control panels.

Prior to the beta test, the Centrum-3000 was equipped with spring-style steel strippers and standard Wiedemann 114-style punch holders. The turret had 40 tooling stations of various holder sizes.

The new tooling, Wilson High Performance (HP), was designed specifically for Murata Wiedemann to use standard 112/114 punch holders. HP tooling features all the benefits of spring-style holders in order to

use existing punch-tool inventories. In fact, the standard HP holder works with all 112/114-style punches for Murata Wiedemann machines, eliminating the need to purchase additional equipment.

Other features include a spring-style holder with positive stripping, allowing the punch to strip from the material at a faster rate. HP tooling also has a fully guided punch holder assembly, reducing side loading, increasing accuracy, and reducing tool wear. Another feature is the push-button punch length adjustment. It allows click-and-turn adjustments in 0.005" (0.13 mm) increments for punch length adjustments without disassembly. No shimming is required, and there is no need to measure punch length. Just assemble, push, and twist to adjust punch length to the stripper. Punch length adjustments are made without the

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need of any special tooling. The hardened steel stripper not only helps guide the punch, it lasts longer than urethane, and is less likely to pick up slivers and slugs that mark the sheet.

In addition, holders have an internal oil cavity and oil channels that use the oil provided by the machine to lubricate holders, guide, punch, and turret bore.

After more than 12 months of testing, Wilson HP decreased downtime by more than 65%. The key, according to Smith, is the push-button adjustment holder technology. The simple click-and-turn in-machine adjustment reduced average setup time from 30 minutes to less than 10 minutes. The spring-style holder and fully guided punch holder assembly reduced side loading, increasing accuracy and reducing tool wear. These improvements add up to a savings of more than \$10,000 per turret press in annual labor costs while working a full three-shift schedule, Smith reports.

In addition, HP tooling eliminates shims and urethane strippers, creating substantial savings in overhead expenses. The cost of shims for the 114-style tooling is nearly \$500 a year, while the cost of urethane stripper replacements is nearly \$5000 per machine.

HP tooling made a positive impact on Lennox's bottom line. Smith notes it is important to pay close attention to both productivity and expenses. "With the high volume of work we do everyday, HP tooling made sense for our plant," says Smith. "The initial cost is higher than traditional tooling, but the benefits of decreased setup time far outweigh those costs in the long run."

Obtain detailed information quickly on Wilson Tool's HP tooling by calling 800-328-9646 or via www.sme.org. Click on Publications & Tech Info, then *Forming & Fabricating*, and under "Issues On-Line" select the April 2003 issue, then "Turret Tooling Takes A Chunk Out of Downtime." Or, **Circle 180**.

Cutlery Knuckled Down



Robbe & Berking (Flensburg, Germany) dominates the German cutlery market, controlling 50% of the silver and holding a major position in silver-plated cutlery. Its clean-cut, Scandinavian-style designs put heavy demands on the press shop. To ensure quality, the firm decided to use a knuckle-joint press from Schuler to manufacture their silverware.

The designs demand optimum distribution of raw material during the embossing operation. All parts of the workpiece, whether thick or thin, must be embossed with uniform quality. It was this requirement that prompted the company to invest in the new press. "We can flawlessly emboss even the smallest and most detailed patterns," states

production manager Hans-Erich Spiess. "Every detail stands out, even on hard stainless steel. The lines are straight and the edges are perfect with very sharp and clean contours."

Uniform embossing quality requires a high press force. The knuckle-joint press delivers up to 1100 tons (10 MN). "This higher press force helps us do the job in one stroke instead of the previous two," says technical manager Lutz Bittner. Despite its power, the press is extremely quiet. "You can't hear it working," says Spiess. "The noise level in our workshop is 89 dB, but the Schuler press is only 74 dB—much quieter than our other machines."

Machine operation is ergonomically designed. The die is positioned at a level that allows operators easy access. During embossing, the operator sits close to the machine, with all feed functions within arm's reach. Ample space on the left and right in the tooling area makes die setting comfortable. And, the stored-program control system makes die setting run smoothly. "System display shows die holder adjustment in millimeters," Bittner reports. "This makes tool change very easy, since the setting can be reset quickly. Press force is shown in kN, which is also very practical. Training new operators takes only an hour, at most."

To reduce downtime on die change and other functions, Robbe & Berking considered two options. In the lower-cost solution, the upper die is hydraulically clamped and the bottom die aligned manually. The more progressive option is a new hydraulic clamping system developed by Schuler. With this system the embossing dies can be changed in a matter of minutes.

Spiess says the press "reduces wear and tear on the dies, prolonging their life. Even when operating at a higher force, our dies still last as long as they once did on less powerful presses."

The press operates at a good speed, but as Spiess points out, "we could not work at a faster rate since we operate with manual feed."

Call Schuler Inc. at 734-207-7230 to obtain information quickly on the knuckle-joint press. Or access Schuler on the web through www.sme.org. From the menu (right-hand side), click on "Publications & Tech Info." Then from the drop-down menu (also right-hand) click on *Forming & Fabricating*, "Issues On-Line," April 2003, and "Cutlery Knuckled Down." Or, Circle 181.

Shuttling for Efficiency

To increase inspection and large-part handling efficiency, Tower Automotive's Clinton Township, MI, stamping facility uses shuttles at the ends of a tandem press line and a transfer press. The conveyor and shuttle system, designed and built by Atlas Technologies (Fenton, MI), channels stamped parts from a run-out conveyor to the left and right unload trays via a two-position, high-speed shuttle. It can also pass parts straight through to a middle unload position. By alternating between two or three unload stations, the operators have more time to visually inspect the parts prior to placing them in vertical racks.

"The shuttle system gives us more time to do an initial online inspection without compromising the press line's cycle rates," say Chris Cosmo, line technician. "The ergonomics are also better because the unload tray's height can be adjusted for the individual opera-



tor." Automation also eliminates the situation where numerous operators crowd a single run-out conveyor to grab parts as they move out from the press.

On the tandem press line, some parts, such as left- and right-hand A-pillars, are run two up. Each pair of finished stampings is shuttled simultaneously to a stationary unload tray. During typical operation, the two parts are shuttled approximately 14' (4 m) to an unload position and indexed off the shuttle by conveyor belts in four seconds.

Transfer presses typically run faster than tandem lines, and the shuttle-equipped transfer press at Tower achieves cycle rates to 1100 pph, depending on the part. At 900 pph, for example, the shuttle/index time is under three seconds. The two-position reciprocating shuttle always has one side empty, ready to pick up the next part while the other side delivers a part to an unload station. When press speeds are slow enough for a single operator to handle the unload function, parts can be passed through to a center station without being shuttled. The center station can also be used as a third unload station for extremely high cycle-rate stamping.

For additional information, call Atlas Technologies at 810-629-6663 or access their web site via www.sme.org. Click on Publications & Tech Info, then *Forming & Fabricating*, and under "Issues On-Line," select the April 2003 issue, and "Shuttling for Efficiency." Or, Circle 182.