

Disruption-Free Production

Brings a Sense of Urgency to the Pressroom

by Brad F. Kuvin, Editor

Electrolux Home Products doubles press

A large investment and plenty of sweat equity has enabled the pressroom at the Electrolux Home Products plant in Springfield, TN, to dramatically increase its capacity in a few short years. The 56,000-sq.-ft. pressroom stamps out twice as many parts for kitchen ranges per day as it did in 1995. How did it manage to do this without adding new equipment? Credit goes directly to a program implemented in 1998 called Disruption Free Production (DFP), focused on personnel and training issues, equipment setup and timely maintenance aimed at optimizing press uptime.

First and foremost, Electrolux invested heavily to update presses with new drives and controls, to allow them to run faster and more accurately. Secondly, eight new servo-controlled roll feeders, supplied by Dallas Industries Inc., Troy, MI, were installed to increase feed accuracy and improve control reliability. And two new servo-transfer systems, supplied by HMS Products, also in Troy, MI, were installed on two critical presses to replace obsolete controls and increase accuracy.

production by meticulously tracking and

minimizing downtime events, streamlining

maintenance procedures and implementing

quick-die-change techniques.



To make sure that the improved presses run at their highest possible uptimes, engineers addressed the difficult-to-manage people issues that can limit productivity in areas such as die changing and press maintenance.

Understanding Downtime

To improve troubleshooting activities and prioritize the decision-making process used to implement productivity-enhancing ideas, the firm invested in new process controllers that track and manage production data. Controls were installed on each press as it returned from its 14-week rebuild. Then, pressroom manager Brad Graham, with plenty

of production data at his fingertips, embarked on a mission to minimize press downtime by slashing press-setup and die-change times. He also streamlined press maintenance and repair procedures, enabling the pressroom to quickly recover from downtime events and make shift transitions smooth and fast. In short, Graham looked to create a sense of urgency in the pressroom.

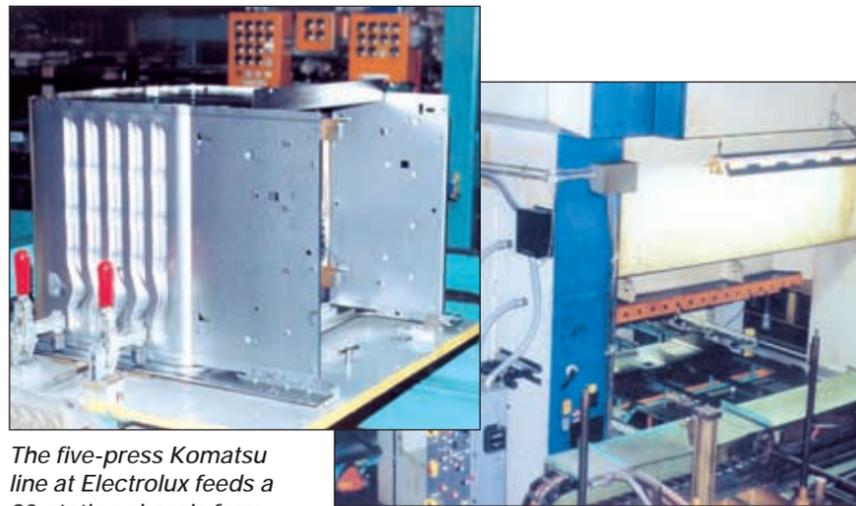
"Since September 1999, we've been able to increase production by 143 parts per person on our 300- and 600-ton stamping lines," says Graham.

To identify training needs among his crew of 166 that helps keep 26 presses running strong, Graham needed production data, and plenty of it. Immediately after taking over the pressroom last September after transferring from the industrial-engi-

neering department, he decided that the best way to collect the needed data—pinpointing productivity and downtime issues in the shop—was to invest in new press controls. These controls would automate downtime reporting and deliver data right to his office computer.

“Before, all of our downtime reporting was performed manually, so if I wanted to know how many parts we were making at any one press or press line, I had to add it up myself,” says Graham. “I spent hours and hours calculating uptimes and utilization numbers. Often, by the time I could digest the numbers, it was too late to make any changes that would improve production. Now, with production data and downtime reports available in real time, I know why equipment is not running. I’ve been able to identify trends, quickly implement changes and track improvements.

“We’re learning which dies run faster in which presses, for example,” Graham adds. “Die changeover is the number-one reason that a press goes down and we’ve invested heavily in training, rearranged our shop floor and die-staging tech-



The five-press Komatsu line at Electrolux feeds a 20-station chassis form-and-weld line. The press line produced 1.3 million hits in 1999.

niques and purchased some hardware to quicken our die changes. Also, we’re emphasizing smart and creative tooling repair—we run a lot of old dies here, and we have to work hard to schedule die repairs so that we still have stamped parts available for assembly.”

Why a Press Stands Idling

The downtime-tracking setup

purchased by Electrolux revolves around LinkNet software from Link Electric & Safety Control Co., Nashville, TN. It runs on standard IBM-compatible computers running Windows 98 or NT, taking data from press controls and tonnage monitors.

LinkNet connection boxes wired to each press control are daisy-chained through the Electrolux pressroom; data dumps into Gra-

ham’s office computer. Data stores in Microsoft Access database files for use in spreadsheets, databases and word processors. Available data includes average tonnage collected over 10-min. intervals, production rates, lifetime average tonnage and stroke rate, and part-counter status. Every time a press stops running, the software receives a downtime code—either created by the program for machine-related downtime, such as die protection, or entered by the press operator. The program records the time of the event and how long it lasted so that every second of press downtime is recorded and explained.

Part count for each press is updated in real time by the program, as is strokes per min. Graham also can monitor press status, tracking when each press is in production, when operators are on lunch break or when they’re loading steel. Downtime codes specify die-related issues such as changeover; press-related events such as scheduled maintenance; material problems such as bowed sheet; and problems with accessory equipment, such as changing coils or loading a sheet feeder.

“I am able to look at downtime



Upgrading presses at Electrolux included installing new controls such as the OmniLink shown here on one of the Komatsu presses on the chassis line. Note the LinkNet connection box wired to the control—every press in the pressroom carries one of these boxes, daisy-chained through the plant to deliver production data to an office computer.

comparisons among the shifts,” says Graham, “to see if one shift lags behind another when using the same press-and-die combination. And not only do I have daily production numbers at my fingertips, but I also can review a history of production over a week or a month to identify

trends. Using that knowledge, I can send my trainer into a specific shift to work with a group of operators in order to boost production.

“In fact,” Graham recalls, “in September 2000, we were able to do just that in our 600-ton area. These presses run our most complex trans-

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A year ago, the Electrolux pressroom experienced die-changeover times averaging 100 min.; today, set-ups take 45 min. or less. Focusing efforts on setup-time reduction, it’s implemented several changes, including installing half- and quarter-turn clamps on dies to replace the 14-in. bolts used to fix dies in presses; installing interchangeable blocks on some dies to enable dies to be set up and

run on more than one press; and by redesigning its pressroom floor to enable logical staging of dies to minimize or eliminate the hunt-and-find time process. In addition to locating die-storage racks near the presses, the firm also labeled the racks so that dies are stored in the same places all the time.

Setup-time reduction efforts took center stage here back in 1997 when the firm hired Gary Zunker, president

of Lightning Time Savers, Inc., Nicholasville, KY, to work on streamlining the die-change process on the six-press line used to stamp the range tops. This cook-top press line moved to the Springfield, TN, plant from the Athens, TN, plant in late 1996. Among the issues Zunker immediately addressed were standardization, to eliminate the go-fetch-find process, and a lack of prestaging. Changes he suggested included:

- Standardizing clamp pieces and storing them with the dies;
 - Storing the tools needed for changeover at the presses;
 - Prestaging containers, stock tubs and dies;
 - Clearing scrap out of the bolsters at the end of each shift;
 - Prestaging coils on coil cars and feeding coils to dies during die exchanges and clamping.
- Zunker regularly works

with metalforming shops to implement quick-die-change (QDC) strategies, calling his technique the QDC Blitz. He helps plant management understand and quantify the time and dollar savings that QDC can deliver in their particular operations, and specifies an action plan to implement QDC. The process begins by breaking down the die-change process into a series of time pockets. For this, he requires the plant to

send him a videotape of a typical die changeout, capturing changeover from last good part to first good part.

After viewing the tape, he establishes a team that incorporates a range of technical expertise in the plant, including a production supervisor and floor personnel such as production operators and setup people, as well as engineers. The QDC team attends an eight-hour training program, where Zunker presents basic

QDC principles. Then the team steers its attention to the die-change videotape from their plant where Zunker breaks it down into pockets of time, allowing the team to suggest ways to reduce the length of each step.

Says Brad Graham, Electrolux pressroom manager, “Bringing a sense of urgency to the pressroom meant keeping the presses up and running a much as possible, and die changeover was the

main reason that our presses would sit idle. By reducing the time to change dies, mainly by changing procedures and with little investment in new equipment, we’ve reduced the time spent from last good part to first good part by more than 50 percent. As a result, we’ve set a whole new standard for utilization based on a new understanding of how much capacity we have with our dies.”

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fer dies, and we recently added some new operators there. We were experiencing die-setup and troubleshooting delays. Those presses produce critical parts on dies that we can't outsource, so they need to be running smoothly. We've found that well-trained operators can troubleshoot common problems and have a press up and running in approximately 15 minutes. However, tracking those presses using LinkNet told me that we were experiencing delays as long as four hours. So by pinpointing our training needs, we've been able to realize significant improvements."

Managing Maintenance

Some downtime is unavoidable, particularly when presses show their age. So Electrolux also has worked hard to enable its pressroom to recover from equipment-related downtime events quickly. Mark Frauendienst, senior maintenance engineer at the plant, has been on a two-year mission to upgrade press controls

The control pinpoints the ladder logic to enable the technician to bring a press back up and running in an hour or less. Before, we might have been out of production for several hours or even days.

"Our five-press transfer line, where we produce the U-shaped, three-sided range chassis, is used in every range we make," continues Frauendienst. "That's a lot of hits from those machines. The line feeds a 20-station folding and resistance-spot-welding line to create the range chassis, so uptime there is critical to meeting our plant-wide production goals. And the easy-to-use diagnostics on the new controls make it run with improved reliability."

Half of the presses in the Electrolux pressroom have been outfitted with new OmniLink 5000 press controls, also from

ity to select Spanish-language prompts and diagnostics is very useful."

Happiness is a Frustration-Free Pressroom

"Being asked to double production while working with old presses and controls really challenged this place, particularly the maintenance people," shares Frauendienst. "As we've grown, we've added a lot of new people. By working upfront to collect data from the machines, we've been able to pinpoint training needs. And, the new controls have allowed us to keep the machines running as well as possible.

"We experience less frustration in the shop because our tools are running better and we've been able to cut back significantly on our outsourcing, which makes everyone happy. We're now running several-thousand more parts per week than we were a year ago due to increasing our capacity and bringing out-



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that, among other productivity-enhancing features, make press troubleshooting and repair a breeze. Mark works with a crew of 43 mechanical and electrical technicians, managed by Ronnie Keith, manager of maintenance and facilities.

In early 1998, Frauendienst recalls, "as part of the DFP process, we began to rebuild some of our presses and to speed some of them up by 50 percent. When the presses go out for rebuild, we also install new controls, which, when a press goes down, indicate for the technician the specific fault causing the stoppage. It might be a problem with a tonnage monitor or the lubrication system, for example.

Link Electric. Seven other presses now carry the Link 501 control. The 5000 is modular, allowing a firm to add optional capabilities as needed. It can control the clutch/ brake, a programmable limit switch for sequencing auxiliary equipment such as automation products, and die-protection and process-monitoring devices as well as monitor and display press signatures and tonnage. It also can store as many as 105 production setups.

"One feature of the new controls that we really appreciate," adds Frauendienst, "is their bilingual capabilities. We now have a large number of Hispanic people working here, so the abil-

sourced work back in-house."

Streamlining its maintenance and repair procedures and its die-change activities has prepared the pressroom to handle changing needs and to be ready to accommodate future design changes to the end product.

"If you had told me a year ago that we could accomplish such an increase in production and flexibility," says Graham, "I would have been skeptical. But with our new-found handle on what we can truly produce in this pressroom, thanks to the availability of real-time productivity data and detailed machine diagnostics, we're well-prepared to handle anything that comes our way." **MF**