

# Appliance OEM Lovin' Lubrication as a Way to Boost OEE

Using roller-application systems to apply a new synthetic lube eliminates die-maintenance headaches in an Electrolux pressroom, contributing to the firm's efforts to increase overall equipment efficiency (OEE).

BY BRAD F. KUVIN, EDITOR

The management team at the Electrolux kitchen-range manufacturing plant in Springfield, TN, relies on its pressroom to keep assembly lines stocked just-in-time with stampings that meet strict quality requirements, without fail. This is no simple task, as the firm has asked its pressroom to down-gauge while also stamp spiffier-looking parts with complex forms that often require practical magic from its dies and presses.

When we last wrote about the Electrolux pressroom's investment in new

press controls and quick-die-change procedures, its continuous-improvement plan was called Disruption Free Production (*MetalForming*, December 2000). The plan focused on training and timely maintenance to optimize press uptime. Today, the plan has evolved into a more encompassing OEE hierarchy of metrics that has plant managers and engineers looking at efficiency and productivity from every conceivable angle.

Most recently, its pressroom engineers and tooling team have joined



Programmable fluid controllers (right) deliver synthetic lube to each roller-application system (left) to accurately dispense lube to the top and bottom of the stock. "All of the presses used to have their own lube-mixing equipment, with lube pumped to spray nozzles on the dies," says plant maintenance engineer Mark Frauendienst. "Now we're using a central mixing station with lines running to each press's roller-application system, to ensure consistent mixes."

forces to develop a new die preventive-maintenance area where it cycles dies through a rigorous inspection and maintenance protocol. It's using its press controls and plant-wide networked control software (which we wrote about in 2000) to trigger the PM routine automatically, based on attaining a specified number of hits for each die.

## A Better Lubrication Approach

The plant's overhaul of its press-lubrication approach, a project completed a few years ago, helps allow the pressroom's maintenance team to get to the point where it could accurately predict die life between maintenance cycles, and therefore implement a robust PM schedule. The project saw the pressroom switch from spray lubrication to roller-application systems, which resulted in less die grinding and polishing and more hits between maintenance cycles. It also boosted the confidence of the firm's engineers that its dies will run as-designed without unscheduled press downtime.

Overall, the switch to roller-application lubrication systems has led to a 15-percent reduction in die-maintenance time, according to process engineer Mike Hanson. This has freed up toolroom personnel to perform other tasks, such as investigating new ways to better implement die-protection technology—yet another project underway at the plant to improve OEE. And, increasing its return on investment even more—lube consumption has dropped by at least 25 percent.

"Spraying lubricant on only the top-side of our coil stock as it fed into the presses," Hanson recalls, "just wasn't good enough. We could not get enough lubricant to adhere to the bottom of the stock, and as a result we were experiencing too many splits, particularly on deeper draws. In some cases, we'd even stop the presses periodically during a production run to pour lube onto the bottom die section—not exactly a good way to optimize OEE."

The 60,000-sq.-ft. Electrolux pressroom (recently expanded from 56,000

sq. ft. to make room for a new stainless-steel stamping line anchored by new Stamtec 400- and 600-ton presses) houses two production cells. A lighter-tonnage cell comprises seven presses from 250- to 400-ton capacity that run progressive dies; a higher-capacity cell comprises two 600-ton presses that run transfer dies and a 500-ton progressive-die press. A few 150-ton presses round out the lineup.

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## Precise Control

The firm is using Unist SPR-2000 programmable fluid controllers at each lubricant-application system (Unist's Uni-Roller system) to accurately dispense lube to the top and bottom of the stock. Rollers are felt covered; press operators can adjust roller pressure pneumatically to fine-tune the thickness of the lubricant coating based on the application. More pressure on the rollers makes for a thinner coat, and a looser squeeze allows the lube coat to thicken a bit.

Inside of each roller is a dispenser tube the length of the roller, with tiny holes spaced along its length. Each time lubricant injects into the tubes—triggered by press stroke—it emerges from the holes in a nice, even pattern across the inside of the rollers for transfer to

the coil stock. Rollers come in a range of widths from as narrow as 3 in.; users can mix and match roller width to allow the SPR-2000 to control lubricant delivery in zones based on coil width for a particular die.

"We're processing three material types—bare cold-rolled steel as well as aluminized and galvanized stock," says Hanson. "Thickness ranges from 0.015 to 0.058 in., with the majority of the material between 0.020 and 0.028 in.

"And, we're using three different recipes of lubricant," Hanson continues, "based on material type and thickness. A 5- or 10-percent mixture of lube with water handles most of the material, while a 20-percent mixture flows to the 600-ton presses for deeper draws and heavier-gauge material."

## The Switch to Synthetic

Along with the switch from spray to roller systems for lube application, the firm recently standardized on a new synthetic lube for all of its parts. It had been using a paraffin-based lube on its 600-ton presses, having switched over to a synthetic lube for its lower-tonnage presses a few years ago.

"We believed that the heavier-gauge work and deeper-drawn parts still required the paraffin lubricant," says Hanson. "However, late last year we tested the synthetic on the 600-ton presses and the roller application systems deposit a nice, even, consistent coat top and bottom that provides the quality and repeatability required."

One stamping in particular made Hanson a real believer in the roller application system and synthetic lubricant: an oven bottom with a 4- to 5-in. draw. "We used to struggle at times forming that part (on a 600-ton transfer press)," shares Hanson. "But now the part runs without fail. And, we've gotten rid of the mess we used to have from drowning the part in lube."

An added benefit of the switch to synthetic, says Frauendienst: "It's much easier and less costly to clean the parts before we send them up to assembly. While the synthetic costs more to purchase than the paraffin product, we can

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easily recover that cost through our wash system where we only need to use soap and water, and use a much lower temperature. Also, we're able to recover and reuse any lubricant that drips off of the part or the rollers."

### **Less Pit Pumping**

Frauendienst—and everyone else on the pressroom's maintenance team—notes other benefits from the switch from spray to roller application. "It's definitely much easier and less costly to keep the shop clean now that we've eliminated the flooding of material and dies that we used to perform," Frauendienst says. "We're no longer tracking

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lubricant all over the plant, and we also have significantly reduced the amount of time and expense required to pump fluids out of our press pits."

Next up for the firm: Tying the SPR-2000 programmable fluid controllers to its press controls (OmniLink units from Link Systems) using Unist's press-control interface, so that the lube-system setup can become part of the overall job program developed for each die.

"Connecting the lube-system controls to the press controls will ensure that every job runs exactly as it was designed to run," says Hanson. "It takes a certain amount of operator discipline (and time) to set up the system with every die change, and we're trying to eliminate that extra requirement of our operators. That will free them up to perform other tasks, and ensure we deliver the optimum amount of lubricant for every part."

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