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Carton coders are something to cluck about

Rose Acre Farms installs 78 ink-jet printers to code cartons of its farm-fresh shell eggs. The low-maintenance, all-electric printers provide crisp, legible codes, decreased consumables costs and 'eggs'-treme ease of use.

Anne Marie Mohan, Senior Editor

It has been said that the egg is nature's perfect package. The egg protects its precious contents with a porous shell that—while it allows for evaporation—has a unique weave that repels incursions from bacteria. In today's marketing terms, the eggshell is easy-open, grippable and recyclable, offers tamper-evidence and has an easily identifiable shape. But there are a few things that nature left out—among them, break-resistance and usage instructions.

Across the nation's heartland, Rose Acre Farms, Inc. (Rose Acres), headquartered near Seymour, IN, is adding to the egg what nature left out. With a firm commitment to providing "secondary" carton packaging comparable in quality to the farm-fresh product inside, Rose Acres has recently expanded and upgraded several of its egg-processing facilities.

Last year, Rose Acres' Cortacres egg farm opened an 80,000-sq-ft addition to its facility for shell-egg processing, cooler storage and dried-goods storage. The upgrade included the installation of a new, 13-lane egg grader, equipped with 11 new **Hitachi America Ltd.** (**www.hitachi.us/ijp**) ink-jet printers from **Pak-Tec, Inc.** (**www.pak-tec.com**) and a new robotic palletizer from **Fanuc Robotics** (**www.fanucrobotics.com**).

Five other Rose Acres plants received new

Diamond Systems (**www.diamondsystem.com**) graders, as well, each one outfitted with 11 Hitachi PX Series IJP printers. A seventh existing grader was upgraded with 12 printers, bringing the company-wide total of new printers to 78. In addition, robotic palletizers have been installed at five other facilities.

"We have made a huge investment to make our overall package better in the industry," says Rose Acres' Randy Wasson, egg processing manager, Southern, IN. "Cortacres is a state-of-the-art facility right now; everything here has been designed to provide a higher-quality product. I don't know of any other plants in the industry that even come close."

Rose Acres can trace its history back to 1939, when the company's founders began selling their barnyard-born Rose Acres-brand eggs to the Indianapolis Farmers' Market. In 1955, Rose Acres constructed its first chicken house in Seymour, and the business has grown steadily since. Today, in addition to its 14 "layer" facilities—or plants where chickens lay eggs for processing—the company also breeds its own stock, runs its own hatchery and feed mills, and operates its own egg-breaking and egg-drying facilities for liquid and powdered egg products, respectively.

Eggs move through a blood-detection system, above, that shines a light through the eggs to see if there are any blood spots within. Egg cartons are coded by a four-line ink-jet printer, at top of page, with the Julian date, plant number and sell-by date.

Rose Acres' biggest business is shell eggs, which it packs for many supermarkets and other large chain stores under the stores' brand names, as well as under the Rose Acres name. Its farm-fresh shell eggs are categorized into five sizes for retail—jumbo, extra large, large, medium and small—in varieties that include white and brown shell eggs, free-roaming cage-free eggs, Golden Premium nutritionally enhanced eggs and certified organic eggs.

Wasson relates that 99 percent of Rose Acres' eggs are U.S. Grade AA, which, according to the U.S. Department of Agriculture's grading system, means that the eggs have whites that are thick and firm; yolks that are high, round and practically free from defects; and clean, unbroken shells. The balance is U.S. Grade A. Packaging options include polystyrene foam cartons from **Dolco** (**www.dolco.net**), paper/pulp containers and clear plastic cartons, in six-, eight-, 12- or 18-pack sizes.

The Cortacres plant, built in the mid-1970s, comprises 32 hen houses, a processing facility and an egg-breaking plant. During a recent visit by PD, Ty Harweger, complex manager at Cortacres, said, "Currently, we are producing 5,600 to 5,700 cases of egg cartons per day. When our remodeling is finished, we will be doing well over 7,000 cases a day." He adds that one case of eggs holds 360 eggs, for a current output of more than 2 million eggs/day.

Last year, when Rose Acres installed the new Diamond 8400 graders, it made the decision to upgrade its carton-coding capabilities, as well. Previously, the company had used manual-stamping or viscosity-driven ink-jet systems that required high maintenance, involved considerable consumables costs and did not provide the desired legibility. "We as a supplier feel that it is very important for the consumer to be able to read the carton," remarks Wasson.

Adds Harweger, "Of course, code-dating is a requirement, but as far as the marketing of the product, when the type is more legible, it just makes the carton look that much better. We really put a lot into our carton graphics, and having clear sell-by and use-by dates just adds to that."

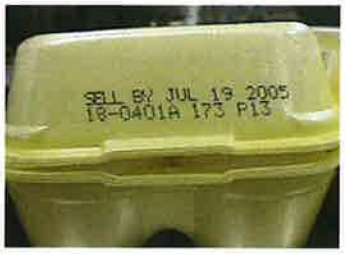
Although the company considered laser-coding equipment, it was concerned about the visibility of the code on some of its cartons, such as its clear plastic containers, the high cost of replacing worn out tubes and the safety of the equipment. After a demonstration of the Hitachi PX Series IJP printer by Marc Daniels of Pak-Tec, Wasson was sold.

"He showed us that the printer uses considerably less consumables than the competition," Wasson recalls. "Also, it's much more user-friendly when it comes to changeovers and setups, and maintenance is much simpler, too."

Daniels explains that the Hitachi printer uses an all-electric, density-driven ink circuit that enables the system to automatically add solvent or ink to the ink circuit when needed, to keep the ink density stable. "That's an extra step that most ink-jet printers don't do," he says. "This is a feature that Hitachi designed to maintain the best print quality around the clock. Some people may only run the printer two days a week, and this feature enables them to get a high-quality print as soon as they turn the printer on."

This functionality, combined with an improved ink-circulation system that reduces solvent evaporation and provides a more stable ink return, results in less ink and solvent use and reduces the associated smell. "Ink is the most expensive of the consumables," notes Wasson, "and that's what we use the least of."

Daniels relates that another of Pak-Tec's customers is using the Hitachi PX Series printer in a similar environment and has reported that they only have to top the ink off every three months.



A phalanx of 11 ink-jet printers, left, stands at the ready, with printheads arranged on one side of the carton conveyors and consoles mounted above. Among the features of the printers that appealed to Rose Acres was their ability to produce crisp, legible copy, above.

Installation of the 78 Hitachi PX-D460U printers began in January 2004 and concluded last December. As Wasson recalls, the first step was to determine where to place the console cabinet and printhead on the line. Although the console includes the largest LCD color touchscreen available, at 10.4 in., the cabinet has a fairly compact footprint of 15.7 in. wide, 11.4 in. deep and 20.3 in. high. The printhead connects to the console via a 13.1-ft cord. The solution devised by Rose Acres and Pak-Tec consists of placing the printhead on one side of a conveyor carrying filled, closed cartons to a packing station, while the cabinet is mounted on a shelf built by Diamond and positioned over the conveyor.

The four-line printers are used to print either two or three lines of text, including the Julian date, the plant number and the sell-by date, as well as a use-by date, when required. Harweger explains that while many of the sell-by and use-by dates are determined by state regulations, some are at the discretion of the customer. To reduce job setup time and ensure accuracy, the printer includes an auto-dating function that automatically adjusts the Julian date and the sell-by date as soon as the operator selects a new job.

Daniels adds that, while Rose Acres is not using it, the printer also includes a character substitution feature, whereby any word or letter can be automatically substituted with another.

To create messages, Rose Acres uses the printer's built-in software, which includes nine resident fonts. The printer comes standard with with low-, medium- and rapid-speed software.

At Cortacres, a library of messages is maintained on one printer. When necessary, the messages, along with the associated parameters and logo data, can be copied to a CF card for installation onto any of the other printers. Depending on how much data is in each message, each printer is capable of storing approximately 300 messages. Hitachi offers an optional, Windows-based Message Manager software

Each packing line provides six lanes into which the eggs are fired. When six eggs are present, the machine indexes them forward and lowers them, small-side-down, into open cartons, left. Filled cartons move underneath a missing egg detector, above, that will stop the process if an egg is missing.

package that enables the user to create and edit messages on any PC, with the number of messages limited only by the size of the PC's hard drive. The standard Message Manager package can communicate with up to 16 Hitachi printers.

The Hitachi PX printer also allows the operator to create logos or make custom fonts using the printer's color touchscreen. Optional Logo Editor software lets the customer convert bitmaps to logos and transmit them to the printer.

In terms of speed, Daniels estimates that the printers at Cortacres are operating at roughly 75 to 80 ft/min, depending on how many lines of text are being printed. He adds that Hitachi's single-line maximum print speed is well in excess of 1,100 ft/min.

Positioned near the end of the egg-processing line, the printers are just one component of a new, state-of-the-art system equipped to ensure the quality and consistency of Rose Acres' shell-egg products. Even before processing, however, Rose Acres has engineered its production "line" to the highest standards. As mentioned earlier, 2.7 million hens at the Cortacres location comprise the production process, with each hen laying approximately one egg every 24 hours. "A good-producing chicken will lay, on average, around 330 to 345 eggs per year," says Harweger.

As the eggs are laid, they roll away from the hens and onto a conveyor-belt system that carries them to the front of the laying house. The eggs are then transferred to a main belting system that carries them from the houses to the egg-processing line, where they are organized into rows, 12-eggs-wide, by an orienter and conveyor system from **Lubing Systems, LP (www.lubingusa.com)**. Once arranged into rows, the eggs are carried through two Diamond washers that use oscillating brushes and 120-deg-F water to remove dirt, blood or other unwanted substances. Upon exiting the washer, the eggs move through a rinser that sanitizes them. Next, eggs go through a crack-detection/leak-removal system from Diamond that detects broken eggs and removes them from the processing sequence. Slightly cracked eggs are directed to a conveyor leading to the plant's egg-breaking facility, which handles liquid egg product.

Those eggs that are fully intact then proceed through a Diamond dryer where they are blown dry, after which they are carried through a dirt detector that directs any eggs that have not come clean back to the washer. Eggs that are clean proceed to the grader, where they are carried across scales that weigh each egg and grade them according to size. This designation is used to determine onto which of the 12 packing lines an individual egg is sent. First, though, the eggs move through a blood-detection system that shines a light through the eggs to see if there are any blood spots within. When blood is detected, the egg is removed from the line. "It's not uncommon from time-to-time for the birds to lay eggs that have blood spots in them," says Wasson. "It's not unhealthy; it's just not appealing to the consumer."

Finally, those eggs that are intact, clean and blood-free are directed to the appropriate packing line, as determined by the scale. Each packing line provides six lanes into which the eggs are fired. When six eggs are present, the machine indexes them forward and lowers them, small-side-down, into open cartons below. When six more eggs accumulate, the process repeats itself. Filled cartons move underneath a missing egg detector that will stop the process if an egg is missing. The cartons are then carried through an automatic carton closer, and then past the Hitachi coder. Those lines without coders are used for packing cracked eggs that will be sent to the breaking facility, or for small eggs, which comprise such a minute quantity of Cortacre's output that they do not warrant their own printer.

Completed cartons are then conveyed either to a manual packing station or to one of six automatic case packers from Diamond. Once packed, cases are pushed onto a case conveyor that carries them through a Little David case closer/taper from **Loveshaw (www.loveshaw.com)** that closes and seals finished cases, which are then carried to a case-stacking line. A portion of the cases are palletized through the use a new Fanuc M-410*i*B/160 four-axis, electric, servo-driven robot that can handle four different case sizes at one time. The balance is manually palletized.

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With all 78 printers now installed in seven of its egg-processing facilities, Rose Acres is very pleased with the resultant quality, productivity and cost benefits. "The owners take a lot of pride in our graphics," says Harweger. "Our marketing department spends a lot of time creating the Rose Acres-brand packaging, and they were sold on the Hitachi printers. The way the coding looks, it just complements the product."

Wasson agrees, saying "While the cost of operating the ink-jet printers versus the manual stampers is considerably more, when we look at the legibility of print with the new machines, that's where we justify the cost." He adds, "We literally have not had any problems with the printers since they have been installed. There has been only nominal maintenance required, such as changing the filters, and that's been all we've had to do."