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Robotic palletizing solution from Honeywell Intelligrated adds staffing and production flexibility

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Robotic Palletizing Solution From Honeywell Intelligrated Adds Staffing and Production Flexibility, Avoids Worker Injuries, and Yields Floor Space Savings

Please note: "Honeywell Intelligrated" within this case study refers to FKI Logistex. Intelligrated, which was purchased by Honeywell in 2016, acquired the North and South American operations of FKI Logistex in 2009.

Dan Schodowski faced a challenge. As president and CEO of Solon, Ohio-based JTM Products, Inc., Schodowski knew the company was ready to grow, and making the right investment choices would be critical. Should the company buy an existing facility or build a new one? What new material handling equipment would be needed to support the company's growth? Perhaps best known as the remaining piece of the original manufacturer of Murphy® Oil Soap, which was sold to the Colgate-Palmolive Company in 1991, JTM was founded in 1890 as the Phoenix Oil Company, producing axle greases, belt dressings and lubricants for the Industrial Revolution. Today, the company is still privately held by grandsons of the founder, Jeremiah Timothy Murphy, whose initials now form the company's name. JTM's business centers around two product lines: Murphy's™ tire mounting and demounting lubricants; and Phoenix™ pipe joint lubricants used in the construction of water and sewer lines. The company also does private label and specialty product manufacturing. For Schodowski, JTM's steady performance of up to \$10 million in annual sales and an estimated 65 percent market share for its two main product lines gave the company financial stability on which to grow. But in the back of his mind, Schodowski knew that if he were to expand JTM, changes in production techniques would be inevitable for the 114-year old company, its employees and its owners.

Once JTM decided on a new site — its present location just outside of Cleveland — Schodowski's next challenge was to meet the material handling demands of JTM's product range. While the Murphy's line of products is primarily packaged in 25- and 40-pound pails, the Phoenix line is primarily packaged in cases of either quart or gallon containers. With both sets of products needing to be palletized before shipment, Schodowski's factory staff was left with a lot of slow and heavy lifting. "When we decided to move, we looked at how we could set up our operations differently," said Schodowski. "Our layout was fragmented in the old building, and we could not bring in automated palletizers or other automated equipment. We were faced with having to keep adding people to manually load the product on the pallets and truck them somewhere else to have them shrink-wrapped." The Move to Automation "When we started laying out the new facility, we knew that we had a lot more room and that we would be able to run both lines at the same time," said Schodowski. "Running simultaneously in the old plant was a predicament. To do that, we needed extra staff on hand—staff that would be there, even if both lines were not running." What was needed was a solution that could handle both product lines. This would allow JTM to allocate more space in the new 70,000-squarefoot facility for its chemical processing and packaging equipment and its inventory. The answer was an automated palletizer that could palletize both pails and cases.

"Killing two birds with one stone, we thought if we have an automatic palletizer then we don't need somebody at the end of the line," said Schodowski. "The idea was not to eliminate any jobs, but we also didn't want to have to add any personnel when the business started growing." Together with Larry Wilson, JTM's director of operations, the pair researched their options. The two, both veterans of Colgate-Palmolive — Wilson, in human resources and manufacturing, and Schodowski, in accounting and finance — were convinced that an automated palletizing solution would be the most cost-effective way to go. A short list of vendors was drawn up. It was quickly narrowed down to one: palletizers from Honeywell Intelligrated, the only vendor who offered an integrated solution that could handle both pails and cases. That solution, an integrated robotic palletizing cell featuring a Motoman® articulated-arm robot with an Alvey vacuum end-effector, would win the sale from JTM. JTM's robotic palletizer uses a Motoman articulated-arm and an Alvey vacuum-type endeffector designed and built in-house at Honeywell Intelligrated. The vacuum end-effector allows the robot to efficiently handle both pails and cartons and the variety of pallet patterns that JTM employs. "It was either buy two separate palletizers to handle the cases and handle the pails, or look at a solution that could do both," said Schodowski. "When we found out that Honeywell Intelligrated's palletizers offered us the ability to palletize both product lines with one piece of equipment, we wanted to look at that option." Installing the robotic palletizer would also free up floor space in the new plant.

Flexibility in Motion Roughly in the center of JTM's new factory floor, surrounded on one side by the processing and packaging equipment, and on the other by pallets of stacked cases and pails, sits JTM's robotic palletizing cell, enclosed in a safety cage. Pails of Murphy's tire lubricant paste being filled, capped and conveyed up to the cell chug along in the background. With a whirl of motion, the robot rotates to pick up an empty pallet from its pallet-loading station and places it in position at the start of an outfeed pallet conveyor so it can begin palletizing the pails. In the project's original design, 10 pallets are preloaded onto the palletloading station at the start of a sequence and the robot counts its way down. Honeywell Intelligrated is currently working on a modification that will allow the palletizer to sense how many pallets have been loaded onto the pallet station. This will allow the operator to load any number of pallets at the start of a run up to 10, providing JTM flexibility to do shorter runs and vary sizes without having to manually pull pallets out of the cell. On the infeed side of the cell, Honeywell Intelligrated accumulation conveyors take up the pails from the production conveyors and queue them for the robot on instruction from the robot's control system. Depending on the product size and stacking pattern used in the particular palletizing operation, the robot's vacuum tool picks up one or three pails at a time by attaching to their tops, and then puts them down to form the rows and layers of palletized product. When the pallets are full, they are shrink-wrapped by an automatic shrink-wrapper and taken by forklift to inventory on the shop floor.

A similar process occurs for the cases of Phoenix pipe lubricant. The operator sets the system up at the outset, loads the pallets, and lets the robot pick a pallet to begin stacking. The cases come into the cell from a second infeed line, and the process starts anew. Design flexibility is built into the Honeywell Intelligrated system. While JTM does not currently use the robot's full capacity to run both lines into the palletizing cell simultaneously, the robot gives JTM the ability to ramp up production at any time. Beyond allowing JTM to run two lines at once, the palletizing cell handles a variety of stacking patterns and pallet sizes in addition to managing the different pail and case sizes. For the 25-pound Murphy's pails, the robot stacks 40" by 48" pallets with four layers, each containing 12 pails. The 40-pound Murphy's pails are stacked in two patterns. On 40" by 48" pallets, the pattern is three layers of 12 pails each. On 48" by 48" pallets, the pattern is three layers of 16 pails each. For the Phoenix cases of quart containers, the robot uses a 40" by 48" pallet to load 10 layers of five cases each. For the cases of gallon containers, the robot stacks a 40" by 48" pallet six on a layer, six layers tall. Since the case patterns require different placement angles, the robot is able to pick two cases at a time, put one down, turn the second, and then put it down. Honeywell Intelligrated has helped add an additional stacking pattern since the robot was installed.

"JTM's robotics cell uses a sophisticated control system that minimizes the amount of operator interface required," said Tom Simone, engineering manager, robotic products, Honeywell Intelligrated. "To design this cell, we had to look at the sizes of the pails and boxes that would be handled. Since each product has its own pallet build pattern and production rate, we had to determine how much of each product we had to pick at a time, and then go about building the patterns." "We also decided that since we had to handle pails and boxes, we would use a vacuum end-effector instead of a mechanical one," added Simone. "Because we had to pick up different product and different quantities, and because the patterns required us to release product in a few variations, the vacuum was the right tool. We also chose the vacuum because it could pick both types of product from the top, which was the most effective and efficient method for doing that." A Heavyweight Performer JTM's robotic palletizer has lived up to Schodowski's and Wilson's expectations. While JTM only uses the system at 65 percent of capacity, leaving the extra capacity for continued growth, Wilson estimates that the cell now

handles 75 percent of JTM's annual business volume. That volume translates into more than 200,000 pails and 150,000 cases per year, with 75 percent of the pails being the 25-pound size and 75 percent of the cases holding quart containers. In a typical day of palletizing, Wilson says the cell handles either 60 pallets of 25-pound pails, 20 pallets of the 40-pound pails, 40 pallets of the quart cases, or 25 pallets of the gallon cases. The JTM factory currently runs one 7.25-hour shift five days a week with a factory crew of eight, but does not palletize every day. JTM employs 20 people overall. On a heavy day, the robot palletizes as many as 70 pallets of 25-pound pails, up to 3,300 pails total. An average day sees 2,800 pails palletized compared with the 1,800 pails that could be hand-stacked in a day at the old facility, generating a 55 percent productivity gain that has enabled moderate sales growth since the robot was installed. The robot's addition to capacity has also freed the crew to work on other tasks in the factory. "In the old facility without the robot, I would have had to add two people to get up to this volume," said Wilson. Beyond adding capacity, the decision to install a robot was due in large part to the founding family's values and to the safety and ergonomic issues surrounding a loyal, but aging, factory crew. With the robot, some of the crew's most labor-intensive work has been eliminated.

"It was the right thing to do," said Wilson. "The Murphy's have a good relationship with everybody who works for them, and there's a mutual respect among everyone at JTM." A testament to the warm feelings between the employees and the Murphy's is a plaque on the factory's conference room wall, dating to 1918. The plaque, signed by all of the company's employees, proclaims their dedication to the Murphy family. "Not everything is based on hard economics, even though we thought there was a pretty good payback on the project," said Schodowski. "We could be saving someone's back, which could be a worker's comp claim somewhere down the road. Those can be very expensive. When you factor in all of those types of costs, you can say the payback is definitely worth it." Even though hard figures were not Schodowski's chief concern in implementing the project, he believes JTM is seeing a quick return on its investment in the robot. "I calculated it as at least one person's salary and benefits, so my payback could be as little as four years," he added. "I think the payback could be even quicker because as we grow, we won't have to add additional personnel. Our original plan was to keep to a crew of eight, which is where we are today."

On the Shop Floor When the robot first arrived, Wilson said his crew was a bit skeptical and a bit concerned. But over time, those feelings turned into appreciation. After a couple of months, says Wilson, his crew started to say, "Wow, we haven't picked up any cases or pails for a long time. This is really nice." In fact, Wilson added, the trepidation also turned to inspiration, as his crew took it upon themselves one day to reconfigure one of their heavily manual secondary lines to also run through the robot. "They took the line, reversed all the conveyors, and ran it through the palletizer," he said. "All they have to do now is pack the boxes and the robot gets them all stacked." JTM's robotic palletizer, rated for a lifespan of up to 20 years, has performed reliably since it was installed. JTM, which retains its equipment for a long time, expects its new robot to be a dependable part of its operation for years.

"If you walk around out there on the shop floor, we have one particular machine that I think the Flintstones are still running," joked Schodowski. "If we maintain the equipment, we expect it to last as long as we need it." Wilson, the project's chief architect along with Schodowski, worked hard at getting the company's ownership and employees onboard with the decision to implement a robot. He credits Honeywell Intelligrated with the design, integration and support of a system that has met and exceeded all of the company's goals. "Honeywell Intelligrated goes the whole nine yards," said Wilson. "They bring the engineering, the staffing, the integration, the whole package from start to finish. They start with a piece of a paper and end up on the floor producing what they need to produce. If I was going to buy again, I would buy again from Honeywell Intelligrated, no matter what the application." For the dedicated employees, managers and owners of JTM Products, that same tradition of loyalty looks like the formula for another 114 years of success.

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