AGVs follow path to success

By Sara Pearson Specter, Editor at Large

Replacing existing manual, in-house transport processes with automatic guided vehicles has yielded tremendous benefits for the four companies profiled here. By automating the movement of products and work-in-process around the warehouse and manufacturing floors, each of these facilities has boosted efficiency, cut costs, increased productivity and redeployed workers to more value-added tasks. Each cites system's flexibility and ease of deployment as key to enhancing the bottom line for their business.

CASE STUDY 1

Brewery fully automates with laser-guided vehicles

When Carlsberg, Sweden's largest producer and marketer of beer, soft drinks and mineral water, decided to fully automate what had been manual warehouse processes at their Falkenberg, Sweden, facility, the company added 22 forklift laser guided vehicles (LGVs) to an existing fleet of two.

Initially implemented in 2004, the two single pallet forklift LGVs were used to supply empty pallets to production. Four years later, the expanded automation system (Elettric 80, 847-329-7717, www.elettric80.it) was installed in phases without interrupting production.

Ten of the second installed batch of LGVs were equipped with collapsible forks, permitting them to carry either one or two pallets. The other 12 always carry two pallets at a time. The warehouse comprises approximately 20,000 pallets—11,500 in floor storage and 8,500 in gravity flow rack.

The entire storage process has been automated by the LGVs—including pick up at the end of the production lines,

Electric-powered laser guided vehicles carry two pallets of beverages at a time, operating around the clock and transporting up to 500 pallets per hour.

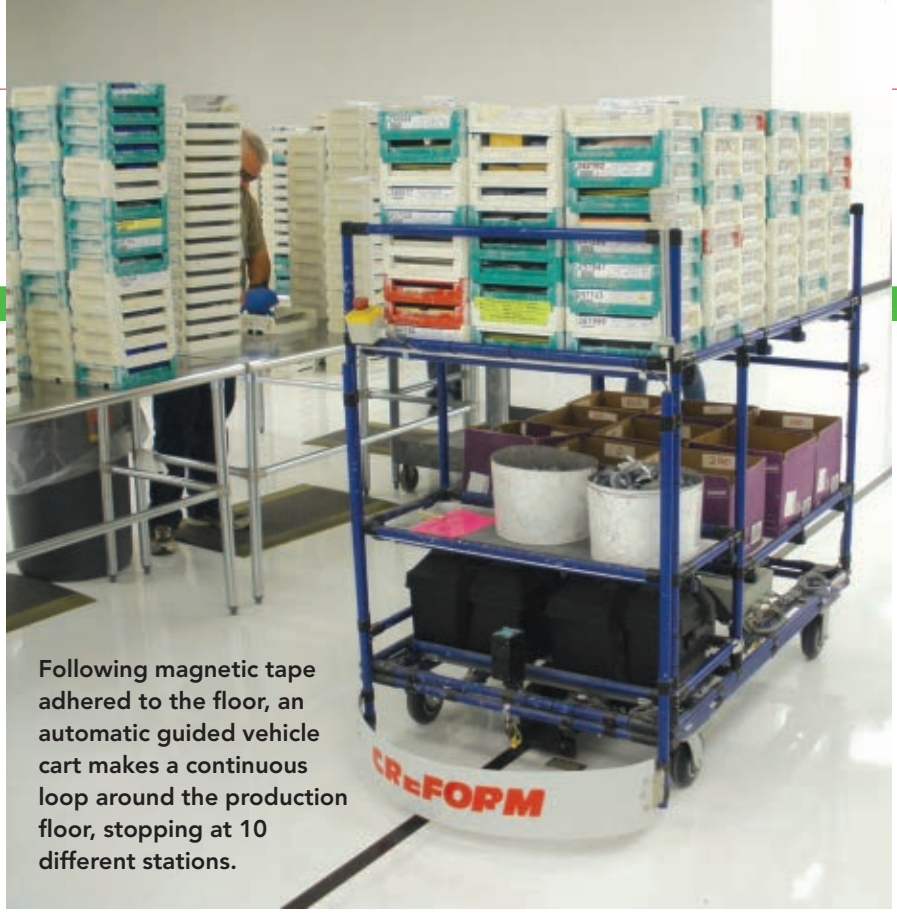
delivery to gravity racks and floor storage, retrieval from storage, and delivery to case picking or to shipping. With Carlsberg's facility operating around the clock, the LGVs transport up to 500 pallets per hour.

The electric-powered LGVs also handle the regular supply of empty pallets and other consumables from an infeed conveyor system, linking a manually handled outdoor storage area to the automated warehouse, and preforms from single racks to the production lines. Load weights range from 220 to 2,200 pounds.

"Through the system we have obtained more stable operation, and the handling of pallets from production to warehouse is now considerably more cost effective," notes Kristoffer Andersson, Carlsberg's warehouse manager. "In addition, the system is flexible and user-friendly."

Andersson particularly appreciates the completely automatic battery exchange process. When the battery is running low, the LGV travels independently to the changing system. Once there, the system master indicates a slot to leave the discharged battery, and a second slot from which to retrieve a new, fully charged one. The procedure takes less than two minutes, after which the vehicle returns to work for another 10 to 12 hours of operation on a single charge.

Because of the system's flexibility, the company has been able to make continuous updates to accommodate changes in handling procedures, Andersson adds. A major update of shipping and pre-form handling processes is planned for later this year. □



Following magnetic tape adhered to the floor, an automatic guided vehicle cart makes a continuous loop around the production floor, stopping at 10 different stations.

CASE STUDY 2

Eyeglass producer's AGVs boost efficiency and cut costs

With more than 500 retail stores in 36 states, Eye Care Centers of America Inc. is the third largest retail optical chain in the U.S. To meet customer demands, parent company HVHC Inc. opened a new production plant in Schertz, Texas, to handle the thousands of configurations of eye glasses the company stocks.

"When we built our new plant, we installed several conveyors to move product," recalls Ric Lee, HVHC's manager of quality operations at Schertz. However, the plant had several smaller volume material handling needs addressed by people pushing carts between multiple locations. "We couldn't figure out an economically justifiable conveyor system that would work for those applications."

The company investigated multiple automated solutions and selected an automatic guided vehicle (AGV) that follows an adhesive-backed magnetic tape on the floor designating the guidepath (Creform Corp., 800-839-8823, www.creform.com). The vehicles—which read the path through a magnetic induction sensor mounted on the cart—are configured from plastic-coated steel pipe, joints and hardware accessories for modularity and flexibility.

The installed system makes a continuous loop around the production floor. The vehicles are programmed

to stop at each of 10 stations for one minute. At these stations, the AGV is loaded or unloaded with trays containing lenses or eyeglass frames, boxes of lenses, cases of frames or small totes of metal alloy.

"It was up and ready in less than an hour," Lee continues. "All they had to do was lay the tape down on the floor. Actually, we changed the path after we got it in because the way we penciled it in was not optimum. We simply pulled up some of the old tape, laid down new tape and rerouted."

Lee notes that the facility plans to do some reengineering in the near future to meet changing conditions so the AGV's path will be changed again. "The flexibility is a nice feature," he adds.

Although Lee concedes that moving product with people pushing parts was also a flexible methodology, that approach was more likely to cause occasional spoilage. "If you have stacks of trays on top of a cart and you run into something and the trays fall over, then you have lenses all over the floor. We could always count on it happening at least once during a shift," he says. The AGVs have solved that issue.

The new system keeps people in their workstations as well, adds Lee. "Each minute counts as far as production, and when people are away from their station pushing carts, that's a production loss."

According to Lee, the company calculates that their return on investment in the system occurred in fewer than six months through labor and spoilage savings. □

CASE STUDY 3

Tuggers deliver auto parts to the production line

Supplying its assembly plants with nearly 20,000 part numbers—including battery boxes, clutches and brake components—the Daimler Trucks North America parts manufacturing plant in Gastonia, N.C., handles more than 30 million pieces every year.

When the company looked to grow while simultaneously implementing just-in-time and 5/S continuous improvement initiatives, it needed a parts delivery system to address efficient workflows for its small fasteners. To meet that need, the company established "Flex Mart," a centralized parts inventory where staff receive new parts, manage orders and fill totes to be delivered to the line.

Although the new system resolved one set of issues, it created another: management quickly discovered that there weren't enough workers available to deliver the fasteners to the line reliably and in a timely manner. Additionally, transportation of the parts was time consuming, inaccurate, and despite high levels of stock, production frequently experienced part shortages.

The company turned to a more flexible, cost-effective delivery system to support its three-shift operation six days a week: an autonomous robot tugger (Seegrid, 877-733-4743, www.seegrid.com). The tugger employs patented industrial mobile robotics technology to move independently throughout the facility. To build a 3D map of the environment, each tugger is equipped with stereo cameras. Further, independent reasoning ability enables the vehicles to navigate a predetermined path throughout the facility to complete its transport task.

In addition to accommodating the company's growth without the need for increased labor, the system has reduced waiting time by 22%, notes Donnie Dixon, supervisor of materials control. The facility has also noted a reduction in transportation time to the line from an hour to 20 minutes—and virtually eliminated inventory deficits.

Because of its versatility, the tugger can traverse multiple routes for the first and second shifts, and subsequently be changed to follow a completely different route for the third shift, Dixon adds.

"We needed flexibility to change the routes easily and frequently and the system does that for us," he says. "That flexibility alone provided us real value." □

CASE STUDY 4

Guided vehicles automate trailer loading

With both production and bottling processes already highly automated, the Quaker-Tropicana-Gatorade (QTG) business of PepsiCo looked to further boost productivity and operational efficiency in their Atlanta, Ga., facility.

The company turned to finished product movement as an area where improvements could be made, ultimately selecting an automatic guided vehicle (AGV) based automated trailer loading system (JBT Corp., formerly FMC Technologies, 215-822-4600, www.jbtc-agv.com).

The system includes 11 unmanned, laser guided, computer-controlled vehicles and host software that is fully integrated in the plant warehouse management system (WMS). The Web-based host software coordinates efficient vehicle movement and shares information with external input/output operations on the conveyors and other plant software. It can also be accessed to monitor system performance.

Vehicles pick up full pallets of finished goods from 10 stretchwrappers and deliver them to the appropriate destination as defined by the WMS. Three possible delivery points include direct to standard, over-the-road trailers in multiple pallet loading patterns; onto bridge conveyors that transport pallets to an adjacent distribution center; or into storage lanes for temporary storage.

The 5,000-pound capacity counterbalance AGVs are outfitted with a single/double fork attachment that allows each to carry one or two adjacent pallets. This permits one vehicle design to service all three delivery destinations.

To manage changes in the vehicles' paths, navigation around the facility is directed by laser guidance. Battery-powered, the AGVs are equipped with an automatic battery swap system. When battery level is low, the AGV reports to an automatic exchange area where the depleted battery is removed and a fully-charged battery is inserted to return the AGV back to operation quickly and maximize run time.

Front, rear and side laser bumpers protect the vehicles from obstacles, bringing the AGVs to a safe stop before contact.

For safe AGV access onto trailers, three interlocks must be met. First, the dock plate must be properly set and engaged. Second, a brief visual inspection of the trailer is conducted to make certain all debris has been removed and the trailer is suitable for transporting the product. Third and finally, a light curtain ensures that no personnel can be in the trailer following the visual inspection. ☐

A 5,000-pound capacity, counterbalanced automatic guided vehicle system loads trailers in multiple patterns.