Four conveyor-topped vehicles ferry loads from an adjacent manufacturing plant.

Keith Arntson, vice president of distribution operations for Del Monte Foods

IN BEST CLASS

Del Monte Foods' new Topeka DC brings laser-guided AGVs from manufacturing into distribution. The result is a best-in-class materials handling system that minimizes costs with room to expand in the future.

PHOTOGRAPHY BLAINE FISHER

By Bob Trebilcock, Executive Editor

Automatic guided vehicles, or AGVs, have been a staple of materials handling in a manufacturing environment for decades. It's not uncommon to find a fleet of 20 or more vehicles delivering product to the assembly line in a large automotive plant.

But, AGVs in a distribution center? Not so much. In DCs, they have largely been relegated to moving product from the plant to an adjoining DC. That may be about to change, if the 420,000-square-foot distribution center opened by Del Monte Foods in Topeka, Kan., last October is any indication.

There, Del Monte has put to work a fleet of 39 laser-guided AGVs (Elettric80, us.elettric80.com).

- Four conveyor-topped vehicles ferry loads of pet products from an adjacent manufacturing plant to a transfer conveyor in the distribution center. There, the loads are automatically placed on pallets and staged for putaway in the DC. Each vehicle can carry four loads at a time.
- An additional 35 fork-equipped vehicles handle most of the tasks usually performed by lift trucks in a conventional distribution center. They automatically put loads away into storage locations on the floor or in pallet rack, replenish pallet pick locations in pick aisles, and deliver full pallet picks to a staging area in the shipping area.

Both vehicle types use a laser-guided navigation system to direct travel through the facility. Lift trucks still play a role loading and unloading trailers at the dock and filling orders for mixed-case pallets.

Lift trucks are limited in use to the docks and case picking.

"This was a greenfield facility, which gave us a unique opportunity to design a facility that leverages innovation and technology from day one," says Keith Arntson, Del Monte's vice president of distribution operations. "We believe this is one of the largest, if not the largest, installations of AGVs in a distribution center in North America."

After less than a year of operation, the system is delivering a number of benefits, including exceptional uptime, accuracy and reduced product damage.

"The system is performing at 99.99% uptime, which was higher than we expected, and the system has been 99.99% accurate," says Arntson. "Our damage rates are significantly lower than in our conventional facilities."

Streamlined operations

The Topeka distribution center was first conceived as a network optimization project. The manufacturing plant in Topeka had no warehouse space. Instead, pet products manufactured in Topeka were shipped to forward distribution centers in Chicago, Texas and Georgia.

Some of that product, however, would end up retracing a route back to the Midwest to fill customer orders. About three years ago, Del Monte began looking at ways to take miles out of its network. The goal was to lower the delivered cost of its products and reduce the lead times it could offer to customers. "Once we completed the network study, the Midwest offered us the greatest opportunity for supply chain efficiencies," says Arntson. "We still ship product to forward DCs in other parts of the country, but in the Midwest, we can ship directly to our customers." Likewise, the DC acts as a forward DC for other complementary Del Monte products that are not manufactured in Topeka.

Once the decision was made to locate in Topeka, the Del Monte team worked with a design and integration firm to develop materials handling processes and systems that would minimize the amount of times the product was handled in the facility, maximize labor and easily scale as throughput at the DC grows in the future.

"We were tasked with building a best-in-class DC that utilized proven innovation and produced the lowest delivered cost so we could remain competitive in the market," Arntson says.

To meet those goals, Del Monte modeled a range of options, from a traditional warehouse to an automated storage and retrieval system (AS/RS) to the AGVs. Careful attention was also paid to everything from the lighting to how the trailers were laid out in the yard.

To learn more about AGVs, the team visited a number of manufacturing sites that were using laser-guided vehicles, in part because no distribution center was using the technology to the extent that it would be used by Del Monte. According to Arntson, the laser-guided technology stood out for three reasons.

First, it was precise. "Our AGVs don't just take a load to location X," Arntson says. "They go to a specific location on the floor to within a centimeter and they do that time and time again." That precision not only meant more accurate inventory and storage information, it also meant that product

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— Keith Arntson, vice president of distribution operations, Del Monte

was unlikely to be damaged as it was moved around the facility.

Second, AGV technology was mature, proven and predictable. "The feedback we got from end users made us realize that this was no longer bleeding-edge technology," Arntson says. "We saw vehicles that had been fully operational in a 24/7 environment for years, and were very efficient and successful."

Third, because Topeka would be a 24/7 operation, Del Monte could more easily justify the capital investment.

In the end, AGVs offered the best opportunity to meet the goals for the new DC. What's more, the technology could easily scale in the future. "If our business grows in the future, all we have to do is add another vehicle to keep up with demand," says Arntson.

Putting AGVs to work

Installing a fleet of 39 laser-guided vehicles involved more than unloading them from the truck and flipping a switch. For starters, to get the most from the vehicles, the location, layout and installation of the storage areas, including the rack system, had to be very precise. "If you install racking in a traditional warehouse you can be a little off," says Arntson. "The specifications have to be spot on to work with AGVs."

Exactness is necessary because the vehicles are so precise that any deviation in the level of the floor or the location of a rack can throw off the navigation system.

More importantly, says Arntson, Del Monte wanted to do more than just maximize the labor requirements for the new facility; the company also wanted to get the same kind of operational efficiencies from the vehicles that it would get from a Tier 1 warehouse management system (WMS) managing tasks in a conventional warehouse. "What's important isn't just that you're using automated equipment," he says. "It's also how well you utilize the equipment to accomplish tasks and drive down mission times."

In Del Monte's facility, the WMS and the AGV control system work together on task interleaving; when a vehicle completes a task, the system chooses its next assignment based on the next closest task to be completed. That minimizes empty travel time and maximizes the use of the equipment.

"We have a large television monitor in the control room that shows where the vehicles are at all times and allows us to watch the entire building operate," says Arntson. "That allowed us to identify bottlenecks in our original design, and then prioritize tasks and implement strategies within the WMS to drive down mission times."

That work was done collectively by Del Monte, the systems integrator and the AGV provider. "We were able to get through the learning curve very quickly," says Arntson. "In a matter of three or four weeks, we had fine-tuned our processes and had full task interleaving in place."

With nearly a year of operation under their belt, Arntson says the project is meeting its goals. "We set out to build a best-in-class distribution center that allows us to reduce waste at all levels with a low delivered cost," Arntson says. Beyond that, he adds, "we have significantly reduced our network miles, which is a sustainability play, and we're closer to our customers to respond to their swings in demand. We're now best-in-class on many of our customer score cards out of that site."

Del Monte relies on more than 30 fork-equipped AGVs for putaway and pallet picking in the distribution center.

Automatic guided vehicles streamline operations

Laser-guided AGVs move product from the manufacturing plant and through the distribution center.

By Bob Trebilcock, Executive Editor

Del Monte Foods
Topeka, Kan.

SIZE: 420,000 square feet of distribution space

PRODUCTS: Pet products

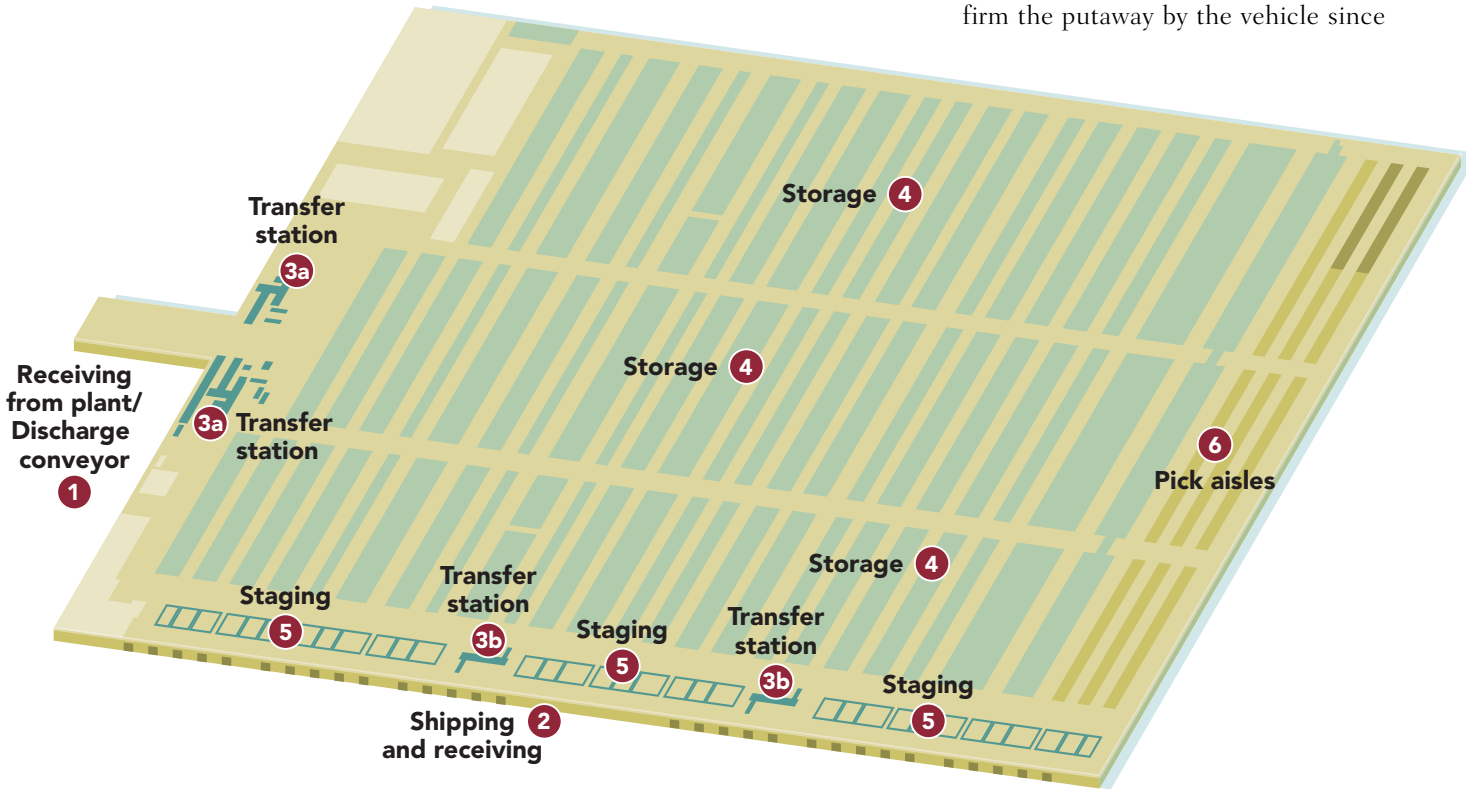
SHIFTS: 7 days, 24 hours

EMPLOYEES: 50 in distribution

A fleet of 39 laser-guided automatic guided vehicles (AGVs) has streamlined the materials handling processes and reduced the number of touches in Del Monte's highly automated new distribution center in Topeka, Kan.

Receiving: The Del Monte distribution center receives product from the adjacent manufacturing plant **(1)** and at the shipping and receiving area **(2)** from other Del Monte manufacturing facilities. Locally manufactured product is automatically loaded onto a slip sheet, stretch-wrapped and staged on a discharge conveyor **(1)**. One of four conveyor-topped vehicles interfaces with the discharge conveyor to pick up a load. Each AGV can carry four loads. Once the vehicle has picked up all of its loads, it travels through a 75-foot breezeway connecting the DC to the plant and drops the pallets at a transfer station **(3a)**. There the slip-sheeted loads are placed on a pallet, automatically scanned and staged for pick up and putaway. At the receiving dock, slip-sheeted loads are unloaded by lift truck and placed on a transfer station **(3b)** on the dock. The load is palletized, scanned, and staged for pick up and putaway.

Putaway: Palletized loads are picked up by one of 35 fork-equipped vehicles. The AGV is then directed to a rack or floor storage location **(4)** based on pre-defined locations in the facility's warehouse management system (WMS). Locations are prioritized based on whether the product is a fast-, medium- or slow-moving item. No bar code scan is required to confirm the putaway by the vehicle since



the system is nearly 100% accurate. Once the AGV drops off a pallet load, the system knows that it is available for the next task.

Picking: As with receiving, picking may be done using automation or conventional processes. Full pallet picks are handled by the AGVs. The system directs a vehicle to a floor or rack storage location **(4)**. The pallet is then delivered to a staging area **(5)** in the shipping area or to replenish a pick location in one of the pick aisles **(6)** that run the length of the building.

Mixed-SKU orders calling for mixed pallets are fulfilled using conventional processes. The WMS delivers picking instructions, including the location and the quantity of cases to be picked in the pick aisles **(6)**, to order selectors on RF devices. Cartons are picked to pallet. Once the pallet is complete, it's stretch-wrapped and staged **(5)** in the shipping area.

Shipping: Once pallets are built, stretch-wrapped and staged in shipping, the system directs lift truck operators to load the pallets onto trailers **(2)**. □

System suppliers

AUTOMATIC GUIDED VEHICLES: Elettric80, 847-329-7717, us.elettric80.com

SYSTEMS INTEGRATOR: Peach State, 800-998-6517, www.peachstate.com

TRANSFER CONVEYOR: Systec Conveyors, 800-578-1755, www.systecconveyors.com

RACK: Unarco Material Handling, 800-862-7261, www.unarcorack.com

WAREHOUSE MANAGEMENT SYSTEM: EXE Technologies (Infor), 678-319-8000, www.infor.com/solutions/scm/wms

LIFT TRUCKS: Yale Materials Handling, 800-233-9253, www.yale.com

BAR CODE SCANNING: Accu-Sort Systems, 215-723-0981, www.accusort.com