EQUIPMENT UPDATE:
Automation's evolving role

Labor savings within the four walls of the warehouse/DC is no longer the primary driver behind choosing a highly automated system. Today, materials handling automation solutions represent a broader supply chain play that improves inventory replenishment, advances piece picking, and cuts transportation costs.

By **Bob Trebilcock,** Editor at Large

Late last year, sister publication *Modern Materials Handling* featured Office Depot's new distribution center in Newville, Pa., on its cover. At the heart of the DC is an integrated piece-picking solution that combines mobile robots for high-density storage and conveyance; light-directed picking to ensure that the associate picks the right item; and a high-speed conveyor and sortation system to get the product to the packing zone.

While this level of automation has been common on high-speed assembly lines for years, it represents a new level of sophistication in distribution. Although the technology allows Office Depot to get a significant amount of throughput from a relatively small labor force, labor savings within the four walls of the DC wasn't the primary driver behind choosing a highly automated system.

Rather, the solution represents a broader supply chain play; it is an enabling technology that will allow Office Depot to completely retool the way inventory is replenished at the stores serviced by that DC. "We believe that the future belongs to the brave," says Brent Beabout, Office Depot's vice president of global network strategy and transportation. "We are in a commodity business and the supply chain is a differentiator. We plan to be on the front end of that."

That is a different way to view materials handling automation, particularly in distribution where the historical approach to system justification was based on a reduction in head count. It got us to thinking: Is Office Depot unique? Or, is something changing in the way the user community looks at automation today? Does the future belong to the brave when it comes to automation inside warehouses and DCs?

To find out, we talked to 10 industry leaders about the state of automation inside the four walls. Here's what we learned.

THE LABOR EQUATION

There is a sense that something is going on in the market: Nearly everyone we interviewed agreed that end users are taking a harder look at automation than in the past even if that has not yet translated into more orders.

"We may be too early in the cycle to be conclusive about what this interest will mean to the market," says Bruce Strahan, president and CEO of The Progress Group. "But I do believe that end users are looking back at the past three years and concluding that all of the layoffs and downsizing they went through was not fun. They want to be prepared for another downturn in demand without wondering every day whether they need 10 more people or 10 fewer based on fluctuations in volume."

What's more, as companies like Office Depot look to logistics as a profit center and an enabler of their broader corporate goals "they are trying to use automation as a competitive advantage over their competitors within their

industry," says Sean O'Farrell, business development manager for Witron.

Solution providers describe an evolving view of automation among the end user community, especially when it comes to automation in the distribution center. Traditionally, that has involved conveyor and sortation systems. That perception, however, is changing.

"More intelligence is required in the distribution center today than in the past, when it was mostly about moving pallets out the door," contends Larry Strayhorn, president of TGW Systems. That complexity is driving interest in automatic guided vehicles (AGVs), robotics, and automated storage solutions along with semi-automated solutions involving software, lights, and voice. "Every company is trying to drive costs out of their supply chain and the DC is the next link in the chain for optimization," Strayhorn says.

Reducing labor has always been the key metric for deciding whether to automate and that remains the case for many projects. However, with so many organizations already running barebone operations, new ways to think about labor and automation are emerging at some companies.

"Our customers are gaining confidence, they are sitting on cash, and they have access to cheap capital," says Jim Stollberg, vice president of global product management for Dematic. "If you look at the unemployment rate, they clearly are not hiring back people. Many are choosing to put that capital to work in automation."

Stollberg and others believe that many of those jobs may not come back. Having already eliminated labor, companies are looking at the costs associated with labor in a different way to justify automation. Those include the increasing cost of training employees given the high turnover rate in many DCs and the inability to find enough labor.

"If a new employee goes out to lunch and doesn't come back, which is hap-

pening, the cost of bringing a new employee up to speed is now part of the calculation," Stollberg says.

What's more, there's a growing acknowledgment that in distribution, lights out automation rarely makes sense, while there is an ROI in making the remaining workforce more productive. "One of the first automation projects I ever worked on years ago was in a manufacturing setting where we were focused on getting rid of as much labor as possible to the point that we probably overautomated," says The Progress Group's Strahan. "Today, there's a recognition that you're still going to have people in the equation, so how do you enhance what your people do with automation?"

That may be as simple as adding semi-automated solutions, like voice-directed or light-directed picking to a manual process. "Voice and light technologies haven't changed a lot over the years, but end users have realized they can make the associate on the floor faster and more accurate," Strahan says. "They're making decisions that affect the product the end customer receives as much as it affects their internal ROI."

Those types of technologies also address the diversity of today's workforce. "The fact is, you can put a headset on a Spanish-speaking person while the associate next to him is speaking English, and they can both get the job done," Strahan adds. "That's pretty attractive."

That approach might also involve adding a mini-load automated storage and retrieval system (AS/RS) or carousel to deliver product to an ergonomically designed workstation, adds Tom Coyne, CEO of System Logistics. "The goal is not to eliminate the human component," Coyne explains. "It's to help the associate reach their potential by eliminating walking, eliminating reading, eliminating waiting, or any other extraneous process. The goal is to help the associate rather than eliminate the position."

Reducing labor remains the primary justification for automated materials handling, but some end users are finding their ROI in transportation costs or more efficient store operations.

In that same vein, companies are looking at their manual processes and asking how they can eliminate the non-value-added labor component. "They justify the project not by eliminating a position but by getting better performance out of their people," says Bruce Buscher, vice president of sales for the smart handling division of Jervis B. Webb.

For example, Webb installed an AGV system to automatically remove bins of cardboard from workstations over a two-shift operation. "The cardboard had to be removed several times during each shift and each cycle took someone away from the workstation for about 15 minutes," says Busher. "We designed an AGV to handle special trash bins. When a bin is full, a line worker pushes a wireless call button and the AGV takes the trash out for them."

Last, but not least, companies are looking at automation to create a safer and more ergonomic work environment, especially in the context of an aging workforce. This is already an issue in Europe, where regulations are reducing the amount of weight workers can move at any one time, or during a shift.

That is becoming a concern to some U.S. facilities. "One of our customers is adding automatic palletizers to their tote handling processes," says Jim McKnight, senior vice president for system sales and marketing for Intelligrated. "Since a tote can weigh 50 to 60 pounds, there's a big ergonomic and safety factor to putting in a palletizer beyond reducing labor."

NEW ROI

While labor remains the top reason for automation, several other variables are entering into the ROI justification.

One of those is flexibility, says Bill Casey, president and chief operating officer for SI Systems. "We have manufacturing customers that want the ability to pick a solution up and take their investment with them if they need to expand or move their operations," Casey says.

That's leading to an emphasis on technologies like automatic guided vehicles and carts in manufacturing rather than traditional conveyor or overhead handling systems that were bolted to the floor. "If something changes, they can reprogram the AGV or cart, or if they move, they can load it onto the back of a truck and set it up at a new location," adds Casey.

In fact, the market for AGVs has never been stronger, and not just among manufacturers. "There are whole new markets out there for AGV systems," says Mark Longacre, marketing manager for JBT Corp. and chair of the Automatic Guided Vehicle Systems group at the Material Handling Industry of America. "The cost of the units has come down, software has made them easier and more intuitive to use in the warehouse, and they are capable of handling different scenarios than they did in the past."

Longacre points out that in addition to transporting pallets or product from one workstation to another, AGVs routinely put away and retrieve pallets from drive-through and push-back rack systems and even load trucks.

Flexible automation is also allowing end users to scale their solutions as needs change. "We've designed a fully automated robotic workstation with palletizing and stretch wrapping," says System Logistics' Coyne. "But we have a customer in Europe that implemented the system with manual palletizing to start, with the idea of installing a robot later this year."

Similarly, TGW has developed a pallet-building solution that combines automation with manual palletizing. In this solution, a conveyor delivers a carton to a workstation at an ergonomic level. The operator, rather than a robot or software system, determines how best to build the pallet.

Once a layer is built, the operator steps on a footswitch that lowers the load for the next layer; at the same time, a stretch wrapper automatically wraps that layer. "The idea is to flush as much of the materials handling out of the system as makes sense, while still having the flexibility to easily build a pallet in a certain way," says Strayhorn.

TAKING A HOLISTIC VIEW

As is the case with Office Depot, companies that own their own stores and control their distribution and transportation processes are justifying automation by taking a holistic view of the supply chain, starting with what happens in the store.

"In Europe, we are implementing systems in the retail channel where the focus is on improving the materials handling in the distribution center to reduce the cost of operating in the store," says Strayhorn. In the past, companies have implemented systems that build aisle-ready pallets, meaning that all of the items on a pallet will be put away in a specific aisle in a specific store. The most sophisticated examples can design a pallet so that the top layer will be stored on one end of the shelf with the bottom layer on the other end of the shelf.

Strayhorn is now seeing systems that take that concept one step further, to loading containers—and not just pallets—with product in the order it will go on the shelf. "We've developed a system that picks women's T-shirts by

size and places them in store-ready cartons in the order that they'll sit on the shelf in the women's department," says Strayhorn. "The store associate simply opens up a tote, puts the cartons on the counter and they're done."

Likewise, one of Witron's customers in Southern California justified the cost of a highly automated system on transportation savings. "The system builds a pallet in an aisle-ready fashion which ends up saving them about half a person per store over several hundred stores in their region," says O'Farrell. "But the automation is able to build a load that is taller than the load they can build manually. That's generating a 20 percent to 40 percent savings on transportation because they're getting more cube on the truck."

TARGETED AUTOMATION

The last trend might be something we'll call targeted automation: Embracing automation where it makes sense and embracing smart manual processes where they make sense.

"One of our rules of automation is that an end user should take a long hard look at a lean approach to operating before they automate," says Strahan. "You don't automate more than you need or automate things that shouldn't be automated at all." Instead of spending $20 million to automate 100 percent of your storage, maybe you can spend $5 million to automate 20 percent of your storage and still get productivity gains from smart traditional processes.

CVS is a proponent of this approach, according to Intelligrated's McKnight. Over the years, CVS has built some of the most highly automated distribution centers in North America. Yet, Intelligrated is working on a project with CVS that involves a traditional wide-aisle, low-bay distribution system.

The takeaway: "From working with automation, CVS has learned that it's important to find the right niche," says McKnight. "They will put in lights out automation where it makes sense, but they won't hesitate to put in a traditional solution enhanced by limited automation if that makes sense."

To that end, materials handling companies are developing flexible and scalable solutions that allow their customers to do just that type of targeted automation. One example is a mobile A-frame developed by SI Systems. "It's designed for the warehouse with anywhere from 16 to 64 fast-moving products and spikes in demand that create bottlenecks," says Casey. "You can move the A-frame into place, lock it down and do order fulfillment of any fast-moving product that has stackability characteristics. If your demand picks up, you add another unit."

Likewise, Swisslog has developed a high-density storage solution that uses bins for storage and robotic extractors that travel on a grid above the bins. "If a user needs to add more throughput, they can simply add more bins or more robots," says Markus Schmidt, senior vice president of Swisslog. "You can start small and easily expand."

THE NEXT FRONTIER

Over the last several years, tremendous achievements have been made in automated solutions for case picking and palletizing that use automated storage, conveyor, and sortation systems as well as robotic palletizing.

The next frontier is piece picking. It is, after all, the most labor intensive activity in a DC. It is also the process with the most opportunity for error. "Piece picking is what we're all trying to conquer," says TGW's Strayhorn. "There are solutions out there, but I don't know that any of us has solved the problem to the satisfaction of our end users."

The most common approach to automating piece picking is a goods-to-person solution that uses some type of automated storage and conveyor to deliver the products to be picked to an ergonomic workstation. There, lights, voice, or images on a display screen

Materials handling automation has been common in manufacturing settings for years. Now, distributors are looking for ways to bring in targeted automation.

will automatically tell the associate how many items to pick and where to place them. That type of solution is most often used to aggregate a high number of slow-moving stock keeping units into space saving storage and eliminate walking on the part of the associate.

Witron has created a variation of that solution for operations that include case and piece picking in the same order. The systems use an AS/RS to automatically replenish a pick face; pick-to-light to optimize piece picking; and software to marry the individual items picked to a carton or tote with full case picks for that order at the palletizer.

Other solution providers, such as Axium, have developed robotic piece picking solutions that completely automate the piece picking process in applications that include a consistent product.

Developments like these, combined with the sophistication of software for automation, could lead to a brighter future for materials handling automation. "I think the most important development is that the industry and end users are more in tune with creating a solution than selling equipment," says Strahan. "We're seeing more people who understand automation and applications than in the past." □

Bob Trebilcock is Editor at Large for Logistics Management