



Distribution Center MANAGEMENT

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Managing people, materials and costs in the warehouse or DC

Material Handling

Mobile fulfillment system breaks through traditional DC design tradeoffs

When designing a material handling system, DC managers are often told they can't have their cake and eat it too. In traditional design, managers must frequently make trade-off decisions between speed and efficiency, speed and accuracy, speed and flexibility, and many others.

Online retailer Zappos.com wasn't willing to make any of those trade-offs. Zappos ships its products directly to the consumer, which means its distribution center in Shepherdsville, KY, is essentially its store.

"Internet distribution is a different animal [than traditional distribution]," says Craig Adkins, vice president of fulfillment operations with Zappos. "The problem is that almost all of the material handling equipment out there is really intended for distribution or case fulfillment for stores."

Rather than adapting traditional material handling equipment to fit the company's direct-to-consumer fulfillment model, Adkins wanted a system that would fit the company's unique requirements. He also didn't want to make any of the traditional design trade-off decisions — he wanted it all.

Adkins chose a new order fulfillment system that uses mobile robotic drive units to move inventory around the distribution center. The system by Kiva Systems is a new way to organize workflow that is faster, more accurate, and less

dependent on labor than traditional automation.

Kiva's founder and CEO Mick Mountz describes this new workflow as parallel processing. It allows workers to pick and sort items in parallel, rather than using serial processing to fill orders. It also offers random access to inventory for picking instead of sequential access. The result is that DCs can be designed without the need to make trade-off decisions.

Robotics in action on the warehouse floor

The system uses a fleet of mobile robotic drive units that bring inventory directly to workers, allowing them to access all inventory items at all times. The robots drive around the warehouse, pick up shelving units (which Kiva calls mobile inventory pods), and deliver the inventory pods to the workers.

The worker picks out the appropriate item and places it in the carton. Completed orders are stored on separate pods, ready to move to the loading dock when the truck arrives.

The benefits of mobile fulfillment:

- Reduced labor costs
- Improved productivity
- Increased flexibility

The benefits of a parallel approach

Kiva's parallel approach to order fulfillment can eliminate some of the traditional design trade-offs between speed and accuracy, productivity and flexibility, and more, says Mountz. "This approach can increase the picker's productivity while simul-

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taneously making the presentations faster, more effective, and of a higher quality.”

Adkins agrees. He says the system will bring Zappos a number of benefits, including:

Reduced labor costs. In a traditional warehouse, Mountz estimates that up to 70 percent of labor time is associated with walking. This system eliminates all walking on the operator’s part. And while most automated material handling systems are designed to eliminate walking, what makes Kiva’s system different is that an order doesn’t have to go to a particular operator. Every operator has access to pick and fill any order.

For Zappos, that means a big reduction in labor costs. “From my analysis, I think it will probably save us 40 percent in labor,” says Adkins.

Improved productivity. The system’s parallel approach means that each picker is now an independent pick/pack operator and fills orders as fast as he can go. Once an operator is done picking one order, a new robot with a new order is waiting.

“The approach avoids that whole non-value-added gather and sort process, simply by bringing the required inventory right to the person who’s filling the order on behalf of the customer,” Mountz says. “The operator can reach his hand in, grab a red T-shirt from its forward location, and put it directly in the carton that is going to the customer. When one order is done, another order takes its place. The worker stays 100 percent busy during his login session.”

Increased flexibility. Adkins says a big factor in choosing the Kiva system was its flexibility and portability. The system’s modular design can be moved and reconfigured at any time.

“If I bought conveyors, racking, and all that other stuff, once it’s installed, that’s it,” says Adkins. “If we ever moved buildings, it

couldn’t be moved easily, if at all. But with this mobile system, if I want to go to a new building, I can put all this stuff in a truck and go. I have nothing bolted down.”

He also says the system’s flexibility means he only has to purchase what he needs today — he can easily add more pieces in the future as his needs change. “There’s some cost avoidance there, because I only buy what I need now,” he says. “I’m not locked into a block design that can never change.”

Finally, the modular design, with no fixed elements, allows the system to be brought online very rapidly. “You can do it in months rather than years,” Mountz says. “It can take three to four months rather than three to four years. We once moved an entire warehouse over a weekend.”

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Drive productivity improvements by using pick-to-light on every SKU in the DC

Most DC managers know that pick-to-light is an important technology for driving productivity improvements. But in a traditional installation, it’s often far too expensive to use pick-to-light for every SKU.

“Let’s say I have 10,000 SKUs I’m managing,” says Kiva Systems CEO Mick Mountz. “Because pick-to-light costs \$100,000 per location, I’m not going to put it on all 10,000 of my product locations. I’m going to pick the most important — maybe the top 20 percent — and I’ll put in a \$2 million pick-to-light system for those fast movers.”

But a robotic fulfillment system could make it possible to implement pick-to-light on every SKU in a warehouse. The system works by keeping the lights in the pick stations, not on the products. That means in a system with 10,000 SKUs, every SKU gets picked, scanned, and packed with a pick-to-light process, whether it’s a fast, medium, or slow mover. And that translates into productivity improvements for every SKU.

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