

# Looking ahead to a new year in materials handling

The 2013 holiday season highlighted the importance of warehousing, distribution and materials handling processes. With Modex around the corner, five thought leaders take stock of what may lie ahead for our industry and our customers.

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With January behind us, we're only one month into the new year. Yet, it seems as if so much has changed since last fall. The industry is a little topsy-turvy and much of that is the result of the 2013 holiday season, which was marked by inadequate planning and a failure of order fulfillment processes to deliver on customer service promises.

Meanwhile, many people are abuzz with talk about using drones and even more automation for same-day delivery. Forget that drones aren't currently legal for civilian use: The seeds have been planted.

Both scenarios shine a light on the fact that materials handling and distribution systems are more important than ever. Moreover, those systems will have to work more closely together than ever and will rely more heavily on data and software. Those are absolute necessities if the industry is going to address the age-old bugaboo of gaining visibility into demand, capacity and constraints so that we can fill and deliver orders in a timely fashion.

With [Modex](#) around the corner, a tradeshow that brings together both the materials handling and delivery sides of the supply chain, we asked five thought leaders from the consulting and academic worlds to comment on how they think the most talked about trends of the day will impact our industry in the years to come.

## **Jim Barnes, CEO, enVista**

### **Understanding the data**

End users have more materials handling tools and technologies available to them than ever before. At the same time, order fulfillment requirements are more complex and service-level agreements are more demanding. Moreover, today's facilities are likely to have more than one order fulfillment engine—more than one tool—to serve a variety of order profiles. Data is the high-octane fuel that powers these new engines. Without it, they fall flat. Jim Barnes, CEO of enVista, says that understanding order profiles is one of the most critical metrics to choosing the right tool for the job.

“I don't think end users spend enough time analyzing their data to understand what is happening today and what will happen in the future—what I call the ‘what is’ and the ‘what is to be,’” says Barnes. “Order profile data is the baseline for a solution.”

One key metric is peak demand. However, the definition of peak demand is changing, especially because of e-fulfillment. Where peak once referred to variations based on seasonal and holiday demand, there are now average-to-peak periods within a shift. “If your service-level agreement is that you will pick and ship anything that drops into the warehouse management system by 3 p.m., you better understand the order flow on a minute-by-minute or hourly basis,” Barnes says. “When you get that granular, you’re going to find that what happens at 1 p.m. is different from what happens at 3 p.m.”

The result, says Barnes, is that facilities have to balance order flow with their staffing levels and materials handling systems. “You can’t put everything in a mini-load or shuttle system for goods-to-person picking because it may not be able to keep up with peak demand for that hour or two when you’re trying to meet service-level agreements,” Barnes says. “Or, you may need different slotting strategies during peak versus non-peak periods.” None of those decisions, he says, can be made without a deep understanding of data.

**Helgi Leja, senior account executive, Fortna**  
**Packaging is the new bottleneck**

In the past, distribution system design came first and transport packaging was an afterthought. As demand for direct-to-consumer and even direct-to-business orders grows, packaging “is a fundamental part of the design of new DCs,” says Helgi Leja, a senior account executive with Fortna. “Packaging has become the new bottleneck within the DC,” says Leja.

Leja refers to these orders as a “batch of one,” because every order is unique. “The batch of one is allowing end users to use their packaging for marketing and to make customers feel special,” he says. Orders from fashion retailers are likely to include designer tissue paper and a sticker that communicates something about the quality of the organization. It’s a way to build customer loyalty. The emphasis on batches of one, however, means that packaging can no longer be taken for granted. “It used to be that picking was your most labor-intensive process, so we worked to make that efficient,” Leja says. “Now, if you’re productive in picking, packaging is the bottleneck, especially with the emphasis on fulfillment speed.”

A pick, for example, can be transacted in seconds. Packaging, on the other hand, can take more than a minute and a half per order. “Automation is the only way for packaging to keep up with picking,” he says. “That’s the next frontier of automation.”

One example of this phenomenon is [MSC Industrial](#), a Fortna customer profiled in the November 2012 issue of *Modern*. Before the growth of MSC’s e-commerce channel, most customers phoned or faxed orders throughout the day. That allowed MSC to spread the workload across a shift. Manual packaging was sufficient for that scenario. Today, customers are likely to add items to an order queue throughout a shift and then

release it right before the order cut-off time. What used to be a day's work has to get done in two to three hours. What's more, MSC is adding promotional literature and value-adds directed at specific customers. The only way to get the work done efficiently was to automate the packaging process.

"There is an automation technology for each of the steps associated with packaging, from right-sizing the carton to applying the shipping label," says Leja. "This is being driven by the competitive landscape and customer expectations. We expect to see more emphasis on packaging going forward."

**Steve Banker, service director, supply chain management, ARC Advisory**  
**Keep an eye on software agents**

Inside the distribution center, the software world has traditionally been divided into two camps: warehouse management systems (WMS) managed inventory, orders and people while warehouse control systems (WCS) managed automated materials handling equipment.

In recent years, WCS applications have assumed some of the order fulfillment functions that were previously the domain of a WMS. While some have called for a new name for this layer of functionality, Steve Banker, service director for supply chain management at ARC Advisory, thinks we need a new software architecture that takes distributed intelligence, or software agents, into account.

"Intelligence is being pressed down into discrete pieces of equipment," says Banker. "A segment of conveyor now has its own motor, a sensor and logic that allows it to automatically close the gap between cartons or divert a carton based on a bar code. In essence, you're putting a small WCS into a discrete piece of equipment."

Banker calls this piece of distributed intelligence a software agent. In human terms, agents are similar to people who have a task to perform, a point of view and a mission to optimize their specific task. "A piece of conveyor's goal is to divert a carton or speed it up and close the gap," he says. While that's important, agents alone aren't enough to optimize an end-to-end process. "Agents don't get you to global optimization. To do that, you need another layer of software with a global view of a process."

That new architecture might look something like this: A WMS sits at the top of the stack and maintains a global view of order and inventory information. The WMS also has visibility into what's happening across the functional areas of the warehouse as other systems report back on their progress.

In highly automated warehouses, where all of the equipment needs to work together, a WCS has a global view of what's happening across the equipment. It can optimize the movement of goods based on what is going on in various parts of the warehouse. However, it may also defer to the WMS for optimization. "The WMS has visibility into

manual packing stations, but a WCS does not,” says Banker. “If that’s your bottleneck, the WMS would be able throttle that back so you don’t overwhelm the pack stations.”

Next is a conventional layer of WCS to manage the islands of automation within a warehouse. A shipping sorter, an automated storage and retrieval system (AS/RS) or a pick module have their own WCS that communicates with the global system.

The last layer consists of software agents distributed at the equipment level, including software that closes the gap between cartons on a section of conveyor or reports to maintenance that a roller or motor needs to be replaced.

“In the end, the upper tier WMS and WCS systems are working toward making the overall process as efficient as possible,” says Banker. “The other layers are optimizing individual tasks, right down to the level of the equipment.”

### **John Hill, director, St. Onge Three trends shaping WMS**

It’s not just WCS that is evolving. The WMS is evolving as well. While WMS functionality has matured, the WMS market is in flux, says John Hill, a director at St. Onge, who has been involved with warehouse management systems since their inception. Hill is following three important developments impacting these systems that are essential to managing warehouse processes.

*Enabling tomorrow’s workforce:* At any gathering of materials handling and logistics professionals, the leading topic of conversation isn’t the latest technological innovation (and, more about innovation in a moment). It’s the shortage of labor and talent for the warehouse of the future.

No doubt, many are trying to figure out how to relieve our dependence on labor through the use of automation, such as robotics. On the other hand, others are focused on how to make distribution jobs more appealing to millennials, who are the workforce of the future.

“We need to offer the same types of communications tools that they are using in their daily lives,” says Hill. “That means industrially hardened versions of the technology with which they are already familiar.”

Hill expects to see more applications deployed on mobile phones and tablets, such as the use of iPads equipped with RFID readers to locate inventory and assets in a warehouse. “These aren’t necessarily new ideas,” says Hill, who points out that Gillette was using handheld palm devices to receive inventory 15 years ago. “But they’re more topical because of the improvements in the technology and the tie-in to the gap in the workforce,” he says. He also expects to see the adoption of more visualization and gamification in WMS systems, with graphics that mimic video games.

*The big get bigger:* Like analyst Dwight Klappich at Gartner, Hill sees a shift underway in the WMS market, as the leading enterprise resource planning (ERP) suppliers capture a bigger share of the pie among large end users with run-of-the-mill warehousing processes. Meanwhile, JDA/RedPrairie and Manhattan Associates continue to dominate in facilities with complex order fulfillment processes. “There is always going to be an important role for suppliers like HighJump, Tecsys, Accellos and Softeon in the small-to-mid-sized market,” says Hill, pointing to the sheer number of warehouses. “But the top end of the market is currently being dominated by a handful of providers.”

*Visibility is more important than ever:* Visibility continues to be the Holy Grail for warehousing, distribution and logistics providers. “With so much emphasis being placed on network-wide control, the WMS provider that can’t assure its client that it can play in that space will be at a distinct disadvantage,” says Hill. “Even small companies that provide products critical to their customers will be equipped to support the transfer of data to a host of trading partners, raw materials suppliers and logistics services providers.” The cloud is, and will, have a big impact on visibility, since it provides connectivity while relieving people of the burden of maintaining an infrastructure on their own, Hill says.

**James B. Rice Jr., deputy director, MIT Center for Transportation & Logistics: Innovate, with caution.**

For those who see innovation as a panacea for what ails us—especially new technology—James B. Rice Jr. has a word of caution: Technology alone will only get you so far. “Users should target cost improvements from applying new technologies in innovative applications in the supply chain,” says Rice, who researches innovation as deputy director of the MIT Center for Transportation & Logistics. “But, in most cases, I don’t see earth-shaking, arm-waving changes coming from the use of these technologies.”

Instead, most supply chain innovations, or SCIs, deliver meaningful, but incremental, improvements. “The genius for a lot of supply chain innovation isn’t the technology itself, but the selection of an economically feasible application and bringing it to scale,” Rice says. “That’s where the magic happens.”

In a column on innovation strategies in the January/February 2014 issue of [Supply Chain Management Review](#), Modern’s sister publication, Rice writes about two types of SCIs: disruptive innovations that bring dramatic change, and sustaining innovations that move companies forward at a steadier pace.

Disruptive innovations make our pulses race because they challenge the status quo, what researchers call the “dominant design.” They promise a whole new way of doing things.

“Leaders tend to be inspired by disruptive SCIs and demand dramatic change,” Rice writes, “even when they lack a thorough understanding of the processes involved.”

The better choice, he adds, is often the sustainable choice. “Sustaining innovations make products better through, say, lower prices or added features,” Rice says. That might not be as exciting as reinventing the world, but those solid, incremental improvements may be the winning strategy that sustains a company’s market position. “Industry will be better off when they either focus on disrupting the supply chain to create a new design or focus on sustaining innovation for incremental change. Rice says. “More focus, less waste.”