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December 2015

Mainfreight

Voice sounds better the second time 16

Nilesh Bhuthadia, global applications manager, Mainfreight

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Dematic to acquire Reddwerks

DEMATIC HAS ANNOUNCED an agreement to acquire Reddwerks Corp., a leading provider of warehouse execution software (WES).

WES provides customers with real-time decision engines to optimize material and information flow in the supply chain. The acquisition is intended to enhance Dematic's existing software suite.

"The global supply chain needs to be flexible, responsive and agile, empowered to deliver goods to consumers on demand," said Ulf Henriksson, Dematic president and CEO. "Retailers and manufacturers need to be positioned to respond to this dynamic demand. The only way to effectively achieve responsive order fulfillment is through an automated supply chain, powered by comprehensive real-time software."

Headquartered in Austin, Texas, Reddwerks will operate as a subsidiary of Dematic under the tradename Dematic Reddwerks.

Kronos and Cornerstone OnDemand announce alliance

KRONOS, a global leader in delivering workforce management solutions in the cloud, and Cornerstone OnDemand, a leader in cloud-based talent management software solutions, have announced a strategic global alliance. The companies will collaborate on opportunities involving Cornerstone's unified talent management platform and Kronos' global workforce management solutions.

Kronos Workforce Ready helps organizations make more informed workforce decisions while fully automating business processes with single-source access in the cloud for time and attendance, HR, payroll, scheduling, tax solution and compliance management. Cornerstone's unified talent management platform includes applications for recruiting, onboarding, learning and development, collaboration, performance management, compensation management, succession planning, and reporting and analytics.

NA robotics market sets records for first nine months of 2015

ROBOT ORDERS AND SHIPMENTS in North America set new records in the first nine months of 2015, according to Robotic Industries Association (RIA), the industry's trade group.

A total of 22,427 robots valued at $1.3 billion were ordered from North American companies in the first nine months of 2015, an increase of 6% in units and 9% in dollars over the same period in 2014, which held the previous record. Robot shipments to North American customers through September totaled 21,436 robots valued at $1.2 billion, breaking the previous record set in 2014 by 16% in units and 10% in dollars.

Automotive-related orders were up 6% through September, while orders to non-automotive industries such as electronics, food and consumer goods, and metals increased 5% over 2014.

Hyster-Yale Materials Handling announces new operating company

HYSTER-YALE MATERIALS HANDLING has announced its wholly owned operating subsidiary, NACCO Materials Handling Group, will change its corporate name to Hyster-Yale Group, effective Jan. 1, 2016.

NACCO designs, engineers, manufactures, sells and services a comprehensive line of lift trucks and aftermarket parts marketed globally primarily under the Hyster and Yale brand names. In connection with the name change, Hyster-Yale Materials Handling and Hyster-Yale Group will adopt a new corporate logo.

The name change is designed to reinforce Hyster-Yale Group's position as the operating company under Hyster-Yale Materials Handling, and to eliminate any confusion created by continuing to use NACCO in the operating company name subsequent to the 2012 spin-off of Hyster-Yale Materials Handling from NACCO Industries.

"The new Hyster-Yale Group name and logo reflect a combination of tradition and progress," said Colin Wilson, president and chief executive officer of NACCO Materials Handling Group. "While our identity may be new, we remain committed to delivering high quality and innovative products across all our brands, including Hyster, Yale, UTILEV and Nuvera. The new name and logo further unify our identities and create an umbrella under which the company will focus on executing its core strategic initiatives."

Nilesh Bhuthadia, global applications manager, Mainfreight

PHOTO: ALI ALMUBARAK/GETTY IMAGES

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60 seconds with... Rosemary Coates, executive director of the Reshoring Institute at the University of San Diego and president of Blue Silk Consulting

COVER STORY

FEATURES

DEPARTMENTS & COLUMNS

NEWS

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MICHAEL LEVANS
GROUP EDITORIAL DIRECTOR

If at first you don't succeed…

We're well aware that the ability to fulfill and deliver anything, anytime, from anywhere is now considered "business as usual," and the momentum to improve service levels, pick accuracy and shipment visibility is building at break-neck speed.

To keep pace and stay viable, we need to operate as part of the new digital supply network—a place where optimized software, mobile technology, wireless networks, sensors and Big Data are converging to offer supply chain professionals the decision-making capabilities to differentiate and thrive.

The technology is here. In fact, it's all around us, and we're all using the elements that make up the fundamental building blocks. However, to plug into the new digital supply network, we need to pull the pieces together, make sense of the data, and then transform our linear operations into seamless, automated networks that respond and optimize processes at any time.

A couple of great examples of this fearless, forward-thinking culture have crossed my desk recently. The first is Cisco Systems, a company that provides the hardware, software and systems that are the very backbone of the Internet.

Cisco is focused on what they call the Internet of Everything (IoE)—the idea that all of the machines, equipment, gadgets and appliances that we use in business and our daily lives will be connected to create the ultimate digital supply network.

According to Jack Allen, Cisco's senior director of logistics and manufacturing solutions, the company is re-engineering its own supply chain to plug into the IoE—something they call "Cisco's connected supply chain and logistics of the future."

In fact, Allen shares Cisco's ongoing transformation to the digital supply network in his keynote address during *Supply Chain Evolution: Technology's Role in the New Digital Supply Network*, a virtual conference presented by sister publications *Logistics Management* and *Supply Chain Management Review*, available on demand. "It's a journey that must be taken by all elements of the supply chain," says Allen. "But to get there, we must try together, fail together, then try together again as part of the process."

In this month's System Report, executive editor Bob Trebilcock offers another terrific example of a forward-looking culture that's not afraid to make mistakes as part of its continuous transformation. Back in 2003, Mainfreight, a New Zealand-based 3PL, adopted voice to support pick processes in its 323,000-square-foot DC in Auckland.

While initial results were promising, the 3PL soon discovered its legacy systems and processes weren't working well with the technology. Productivity dropped, and soon the headsets were collecting dust. But knowing the advantage voice could bring long-term, Mainfreight decided to dig into the compatibility issues and try again.

In 2013, the 3PL worked with a voice integrator, upgraded its WMS, and brought on a new generation of voice hardware and software—and found success. With the new start, picking efficiency improved by 25% and accuracy is above 99%.

"Both Mainfrieght and Cisco are culture-driven organizations with an eye on long-term sustainability of their companies," says Trebilcock. "While most companies think in terms of the next quarter, they're looking to make decisions based on what's ahead over the next 100 years."

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NEWS & TRENDS

RETAIL

Retail sales show slow growth in October, reports Commerce, NRF

FOLLOWING LAST YEAR'S STRONG 4.1% GROWTH, HOLIDAY RETAIL SALES NOW FORECAST TO RISE 3.5% IN 2015.

BY JEFF BERMAN, GROUP NEWS EDITOR

WHILE IT WOULD BE A STRETCH to describe the current pace of retail sales growth as torrid, data issued by the United States Department of Commerce and the National Retail Federation (NRF) pointed to growth levels that have been in line with recent months.

Commerce reported that October retail sales at $447.3 billion were up 0.1% compared to last October and up 1.7% annually, following annual gains of 0.1% and 0.2% in September and August, respectively. Total retail sales from August through October were up 2% compared to the same period in 2014.

The NRF reported that October retail sales, which exclude automobiles, gas stations and restaurants, were up 3.1% annually and up 0.3% on a seasonally adjusted basis compared to September.

October retail sales were up 3.1% annually and up 0.3% on a seasonally adjusted basis compared to September.

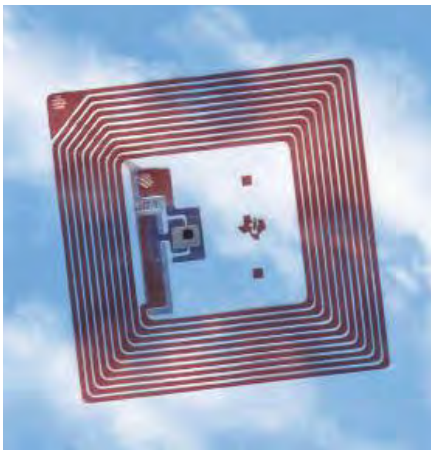
NRF chief economist Jack Kleinhenz wrote in a blog posting that deflationary pressures, unseasonably warm weather, strong annual comparisons and a shift toward spending on services are among reasons that October's retail sales data is "muted." He added that October fell outside NRF's expectations for the holiday season, with the organization optimistic that holiday sales growth will be solid.

"The uptick that is expected to come from recent job and wage improvements has yet to register in terms of our expected economic and spending growth," said Kleinhenz. "As some retailers have already reported, overall third quarter growth left a lot to be desired; however, the picture is improving and consumers should start to spend more freely throughout the holiday season."

AUTO-ID

RFID market to exceed $10 billion in 2015

ACCORDING TO A NEW REPORT from IDTechEx Research, RFID is thriving, reaching total sales of $10.1 billion in 2015 with a large scope



ahead for continued roll-out in many established markets as well as growth in new markets.

However, the report cautions, companies must consider their positioning as many new players enter the market while the value chain consolidates.

About 38% of the 2015 market value is for the tags themselves, totaling 9.1 billion tags sold in 2015, up from 7.8 billion tags in 2014. Those figures are across all the main RFID frequencies for passive and active RFID.

A significant part of that growth is attributed to the increasing implementation of passive UHF RFID tags, also now known as RAIN RFID following an alliance of companies like Google and Intel that was set up last year to promote the technology. UHF RFID is being widely adopted for tagging apparel with 3.75 billion tags used for that application alone in 2015 versus 3 billion in 2014. In 2015, that represents less than 15% of the total addressable market for retail apparel, which is one of many applications.

For shorter-range HF RFID, business is growing as banks move to secure RFID cards enabling contactless payment. In fact, just less than 2 billion were sold for that and other contactless card applications in 2015. NFC is part of HF RFID, too, being backwardly compatible with other HF RFID standards. In 2015, NFC tag sales excluding payment and personal ID applications will amount to 230 million units used in applications such as tagging computer game figures and setting up Bluetooth pairings of consumer electronic devices.

SUSTAINABILITY

Study identifies sustainability disconnect between consumers and executives

WEST MONROE PARTNERS, a business and technology consultancy, has released a study that found more than half of North American supply chain executives currently consider developing a sustainable supply chain as a strategic priority.

Conducted in partnership with Loyola University's Supply and Value Chain Center and BearingPoint, the study also found that of companies that plan to implement sustainability initiatives, improved competitive advantage and brand image are the key motivators. According to West Monroe's study, 36% of companies have plans to incorporate sustainability into their operations and 22% of that group plan to do so in the next one to three years.

Last year, West Monroe conducted a sustainability survey among North American consumers and found that

more than half of consumers are willing to pay at least 5% higher prices for products ordered online if they're delivered sustainably, and 76% would wait at least one extra day for climate-friendly transport. European consumers shared a similar willingness to wait longer and have slightly more tolerance for higher prices, according to the equivalent survey conducted by BearingPoint.

"It's telling that more companies aren't implementing sustainable business practices in their operations given the demands of customers," said Yves Leclerc, managing director at West Monroe Partners. "Most supply chain teams are struggling to manage the complexities of globalization, the war for talent and increasing demands so allocating budget and resources toward sustainability doesn't seem feasible unless companies can put together a business case for the return on the investment." ☐

CORRECTION

In November, the story "Distributor locks down handheld equipment" incorrectly identified the provider of the automated locker system for handheld scanner management. The lockers are from Apex Supply Chain Technologies (apexsupplychain.com).

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Fleet finance harnesses the currency of collaboration

Purchasers, operations managers and other fleet stakeholders join forces to control costs over the life of equipment.

By Josh Bond, Senior Editor

Fleet managers, equipment manufacturers and service providers are talking a lot lately about total cost of ownership (TCO). The concept aims to unite upfront equipment costs, maintenance expenses and operation over the life of the life of the equipment. Seeing an accurate picture of TCO is essential to identifying and realizing efficiency, but it also requires increased cooperation between finance and operations functions.

In the past, if a plant manager said he liked a certain manufacturer, the sourcing manager would go with it as long as it fit in the budget. But now, many decision-makers are more budget-conscious, more competitive and more functions are now involved in those choices.

"We are seeing a lot more collaboration between the CEO, finance, controllers, operations managers, sourcing managers and the COO, all of which sit around a table with us," says Brian Lowe, general manager of equipment finance for Summit Funding Group. "People want to talk about the total cost of ownership, which then filters into the budget process."

Unifying these interests is especially important at the time of the purchasing decision. Lowe says fair market value lift truck leases are prevalent and generally range between 24- and 60-month terms. "The customer wants to focus on core competencies," he says. "They want to use equipment, return it, buy it or continue to lease it on a month-to-month basis. This is a popular for those who need materials handling equipment because it allows flexibility."

With detailed application specs and projections, it's no trouble to design a 43-month or other custom-term lease, Lowe says. When setting up the agreement, it's fairly straightforward to calculate original equipment cost, interest rate and residual to produce a monthly payment.

"When things could go awry is when the terms are based on an incomplete picture of the application and how often the truck is actually used," Lowe says. "If

the customer says he will use 1,000 hours per year, the residual is then set accordingly. If he gets busy and uses it for 4,000 hours per year, the truck won't be worth as much at end."

These situations have led end-users to pursue opportunities to keep costs consistent, including options for pass-through billing that combine the monthly lease and maintenance payments. But even if they are thinking about total cost of ownership, fleet managers rarely have a full understanding of their responsibilities.

"End-users should spend time learning the terms and conditions of how the transaction will be structured," he says. "The master lease agreement should not just be read by a lawyer. All stakeholders should read it so the expectations are known."

Josh Bond is Modern's *senior editor and can be reached at jbond@peerlessmedia.com*

Molded pulp packaging use expands

Alternative material packaging offers sustainable protection for products shipped in any channel.

By Sara Pearson Specter, Editor at Large

Identical to the material used in egg cartons, interest in custom-engineered, molded pulp packaging for product protection is growing, says Bryon Crump, vice president of sales and marketing at EnviroPAK.

Offered as an alternative to expanded polystyrene (EPS) foam, Crump attributes the uptick to greater interest in sustainability. "Consumers are making judgments about a manufacturer based on how environmentally friendly their products are," he says. "If they're considering two identical products, they may draw certain conclusions based on the packaging type used in each."

Products packaged in easily recycled, biodegradable and compostable material—such as molded pulp—tend to be perceived as coming from a source that values sustainable practices and likely runs its operations in a similarly responsible manner, Crump suggests.

"EPS is often much more difficult to dispose of because it is typically not accepted for curbside pickup and requires access to a special facility for recycling," he explains. "Is the average consumer going to seek out a special facility to recycle foam packaging? It's unlikely; they'll probably take the easiest route and toss it in the trash."

Further, with more manufacturing operations returning to the United States, there's been a push to reduce shipping costs by sourcing from domestic producers of molded pulp packaging. Plus, while the electronics market has long deployed this material, Crump notes an uptick in usage for items sold at big box retailers, such as small household appliances.

"That has a lot to do with the omni-channel supply chain trend," he explains. "Primary packaging is being reconfigured so that one common type of protection works regardless of how an item is shipped. Whether shipping items in bulk on a pallet, or sending them individually by parcel carrier, suppliers want the same level of performance without the item having to be repackaged."

Cost-wise, the material is competitive. "When you look at the whole process, molded pulp can even be cost advantageous," Crump adds. "The formed pulp nests compactly to take up less space than EPS foam blocks. This reduces transportation costs and minimizes space usage both in the warehouse for storage and line-side space during packaging."

Sara Pearson Specter is an editor at large with Modern *and can be reached at sara@saraspecter.com.*

Ali Almubarak/Getty Images

Can you hear me now?

Voice is BETTER the SECOND TIME around

By Bob Trebilcock,
Executive Editor

In Auckland, New Zealand, 3PL Mainfreight took a second look at voice recognition technology. The result: a 25% increase in picking efficiency.

IN ONE 323,000-SQUARE-FOOT section of a distribution center operated by Mainfreight in Auckland, New Zealand, team members are directed by voice recognition technology as they pick cases and items.

On its own, that may not seem remarkable. After all, voice technology has proliferated in recent years to drive efficiency and accuracy in picking operations. To many, voice seems like a no brainer. But at Mainfreight, it took two attempts to get it right, proving that some things really are better the second time around.

A supply chain services company that offers transportation, warehousing and distribution services on a global basis, Mainfreight first attempted to adopt voice (Honeywell Vocollect Solutions, vocollectvoice.com) in 2003 to support case and piece pick processes for baby food and snack food products. While initial results were promising, Mainfreight soon discovered that its existing systems and processes weren't working well with the voice technology: Productivity declined, team members soured on the technology and eventually the voice headsets sat idle in a corner. Fast-forward to 2013, and Mainfreight turned things around. Working with an experienced partner (VoiceID, voiceid.com.au), an upgraded warehouse management system (WMS) and a new generation of voice hardware and software, Mainfreight found success the second time around.

Nilesh Bhuthadia, global applications manager, Mainfreight

The measurable results: Picking efficiency has improved by 25% and accuracy is above 99%. More importantly, Mainfreight now views voice as a transformational technology that is integral

to its continuous improvement program. It has plans to expand voice to other processes beyond picking and to other facilities in its global network. "A successful rollout has opened our eyes to the other opportunities for this technology," says Nilesh Bhuthadia, a global applications manager for Mainfreight who worked on both rollouts. "We believe that it's more than a picking tool; it's a move tool. In general, voice is transforming us into an organization that is hands free, more efficient and more accurate."

The steps Mainfreight took on its second attempt to avoid repeating earlier mistakes can serve as a template for other organizations about to adopt voice, or another new technology.

Culture and performance

Founded in 1978 in Auckland, Mainfreight quickly grew into New Zealand's most extensive freight network. Six years later, it made a push into Australia, growing through acquisition and the expansion of its own network. By 1999, Mainfreight had become a truly global supply chain company with the acquisition of businesses in Asia and the United States. In 2011, it moved into Europe with the acquisition of the Wim Bosman Group.

With 242 branches, nearly 7,000 employees in 20 countries and just more than $2 billion in revenue, Mainfreight provides a full spectrum of warehousing, domestic distribution and international air and ocean freight services to a variety of industries, including fast-moving consumer goods, pharmaceuticals and the do-it-yourself hardware and building materials market.

"From a supply chain point of view, we have consolidation points in Asia where we bring in freight and then ship it out by air or sea to our facilities in other parts of the world," says Bhuthadia. "Then, we can crossdock it out to stores or customers, or warehouse and distribute it as needed."

That includes a build-out of its distribution capabilities in the United States. There, Mainfreight launched a logistics

Voice down under

In 2012, before Mainfreight took a second stab at voice in New Zealand, a Mainfreight facility in Sydney, Australia, was considering voice technology.

The facility distributed personal care products into two channels: traditional retailers that would order full cases of product and customers that may get mixed cases or even eaches. Picking across multiple channels and a variety of order profiles was labor intensive. The facility had moved from paper-based picking to bar code scanning, but was looking for another boost in productivity. The facility manager proposed implementing voice-directed picking to Rene Van Houtum, who led the warehousing division in Australia.

Initially, Van Houtum was skeptical. He had looked at voice picking for a specific application in the Netherlands, where he had worked prior to moving to Australia, and a preliminary study there showed no real improvement in picking over bar code scanning. "Continuous improvement is very important to a 3PL like Mainfreight," Van Houtum says. "Before you undertake a project like this, you want to know that you can achieve savings that you will share with your customer." What's more, he adds, he wanted a technology that could also be applied to other applications and customers.

Mainfreight's integration partner in Australia was convinced that with the right processes in place, voice could result in a 20% savings and proposed conducting a pilot at its expense.

The result: It wasn't quite 20%, but Mainfreight achieved almost 10% savings—enough to justify a project moving forward—along with increased accuracy and happier employees. "The critical success factor was that our team members liked it," Van Houtum says. "They were faster because they were hands free. They didn't have to put down their RF devices to pick." Voice went live in 2013.

Van Houtum is now overseeing the expansion of Mainfreight's warehousing and distribution operations in the United States. He will implement voice there, but not just yet.

"Our picking processes aren't as mature as they are in New Zealand and Australia," he says. "Before we implement voice over here—and, it will happen—I want to make sure we have our basic processes right. If you don't have your products in the right places or your pick faces set up properly, voice isn't going to get you to the next level."

Mainfreight specializes in providing supply chain solutions on a global basis for a variety of industries, including fast-moving consumer goods and the DIY market.

division at the end of last year. Since then, it has opened standalone warehouses in Los Angeles, Newark and Dallas, with plans for additional facilities in Chicago and Atlanta. In the United States, the company is targeting players in the fast-moving consumer goods industry with complex logistics processes. "We are deploying the same best practices and warehouse management system that we use in Australia and New Zealand," says Rene Van Houtum, who is overseeing the expansion of warehousing and distribution operations in the United States. "The expansion of our networks allows us to increase what we can offer our customers throughout the world."

While voice has transformed picking operations, some processes are still enabled by RF and handheld devices.

Mainfreight's competitive edge, in the company's view, is a unique culture focused on the "special people" in the company and a 100-year vision—decisions are made on the basis of how they will impact Mainfreight for another 100 years. "We look at each team member as family, and we don't really have a company hierarchy," Bhuthadia says. "We work in open spaces in our offices and we all sit down at long tables for lunch. You're working with your brothers and sisters, and you look after your brothers and sisters."

The company has a tradition of starting employees at the bottom and promoting from within. Bhuthadia, for instance, began his career unloading trucks before dawn. "If a team member has the right attitude, wants to move forward, and is willing to be part of the family for the long term, we make sure there are opportunities for advancement," Bhuthadia says. It's not uncommon to find branch managers in their 30s, he adds.

At the same time, the company is focused on performance. Every manager, team and individual team member

Speaking of success

After two rollouts of voice over a 10-year period, Nilesh Bhuthadia offers several recommendations for companies considering the adoption of voice technology along with several keys to the ultimate success of the technology for Mainfreight.

Recommendations

1) Review your internal processes for warehousing and make sure they are optimized.
2) Get the right partner onboard. They can provide you with insights and learnings from other successful projects they have worked on.
3) Give it a go.

Success

4) Our people: We were able to get them onboard and excited about an opportunity to do more with less.
5) Technology: By the second rollout, Honeywell Vocollect Solutions had developed a solution that better suited our needs and the Mainfreight had become more flexible and had smarter algorithms in place. Compared to 10 years ago, voice is much easier to work with for the team, and there is a higher degree of acceptance.
6) Persistence: Our team was determined not to make the same mistakes the second time around.

In addition to warehousing and order fulfillment solutions, Mainfreight also handles air, land and sea transportation and logistics.

is working toward the common goal of servicing customers and "doing something great." As such, key performance indicators that are important to customers, like error rates, are linked to team members' bonuses. They are transparent: Every branch reports weekly results that are available for all team members to see. And, all Mainfreight branches have quality boards and are internally audited every six months.

The first attempt

Culture and performance came together in 2003 when Mainfreight adopted voice for the first time. The third-party logistics provider (3PL) was using a homegrown WMS to drive paper-based picking. Productivity had peaked. With continuous improvement as one of its cores, Mainfreight began to look for ways to boost its processes. "We knew that picking processes in general were beginning to evolve," Bhuthadia says. "We heard about this thing called voice, and we thought it might be something that could benefit our operation."

Mainfreight Auckland, New Zealand

SIZE: 1.29 million square feet; 323,000 square feet in voice pick area
THROUGHPUT: 8,200 lines per week; 1,640 lines per day
PRODUCTS: Baby food and snack foods
EMPLOYEES: Four in this area
SHIFTS PER DAY: One

A pilot was designed to pick full cases of baby food and potato chips in a facility in Auckland. The early results were promising. "Initially, it was like that bright shiny new toy," Bhuthadia recalls. "The team using voice was walking briskly, even running, because their hands were free instead of holding a piece of paper." More importantly, the members using voice were completing their picking assignments earlier than other team members, which freed them up to do some of the more relaxing tasks in the facility, like cleaning up. A little voice envy set in.

But, it was short lived. Soon, performance began to slip in several ways. For starters, key pieces of information on how to use the system weren't getting passed on during training. That led to snafus like the system not recognizing some voice commands because team members weren't using the microphones properly. There were also technology issues.

For instance, Mainfreight's homegrown WMS didn't integrate well with the voice system. As a result, processes such as stock picking for inventory management and replenishment were out of sync with the voice system. A team member might go to a pick location and find that the items weren't in the pick face or in the right quantities indicated by the system because no one had been directed to replenish a location. After the workarounds, "voice was now taking as long as paper-based or RF-driven picking," Bhuthadia says.

As the luster rubbed off the new toy, the culture took over. Team members, who all had a stake in the performance

of the facility, turned negative on voice. After 18 months, the voice units mostly collected dust.

If at first you don't succeed

Fast forward to 2013, and some important things had changed. Mainfreight's WMS had been given an overhaul, including new functionality and new algorithms. It was now a scalable, flexible and smart platform that could be deployed across multiple facilities and multiple customer requirements. That dovetailed with concurrent improvements in the underlying voice technology. Processes had also been improved through the adoption of RF and bar code scanning. And, employees who had once been resistant to technology were now using smart phones, laptops and tablets away from the workplace. Indeed, Mainfreight had evolved from a company that once viewed technology as a hindrance to getting things done to an enabler of productivity.

At the same time, continuous improvement efforts in case and piece picking in the Auckland facility had once again stalled. "Our numbers were good, but the changes we were trying weren't having much of an impact on productivity," Bhuthadia says. "Our team members challenged us to do more with less. We realized we needed something transformational and not just incremental."

The question was asked: Was it time to give voice a second look?

It's not easy to convince management and team members to make a second attempt with a technology that left a bad taste in the mouths of some team members. Before moving forward, Bhuthadia says his group white-boarded the first initiative and identified four "Lessons Learned" that needed to be addressed for a successful initiative:

1) Voice technology: Mainfreight recognized that voice had come a long way in 10 years. However, it wanted to be sure that voice would work in a 3PL environment.

System Suppliers

VOICE RECOGNITION TECHNOLOGY: Honeywell Vocollect Solutions
WMS: Mainfreight
VOICE INTEGRATION PARTNER (AUCKLAND): VoiceID

An associate prepares to put a pallet away into storage.

2) WMS: The group wanted to ensure that the WMS had the right algorithms to support picking, inventory management and replenishment.

3) The business: Was the business ready to re-introduce this technology, and if so, what was the best way to get it back into operation?

4) The team: They wanted to turn Mainfreight's close culture into a positive attribute by including team members in the process and making certain they understood the difference the technology could make if done right. In that sense, the company culture could help bring about success.

At that point, the Auckland team brought in a partner with experience in voice technology. "We are firm believers in partners," Bhuthadia says. "We wanted someone who was as passionate about our business as we were, and who could share their experiences with other customers to give us a different perspective on our processes."

Together, they reviewed the "Lessons Learned" and looked at ways to improve their existing processes. Once they were convinced that the voice system was integrated with the WMS, they launched a limited pilot, outfitting only a handful of order selectors with voice technology. Once again, there were initial productivity gains by the voice-directed pickers. This time around, the gains stuck because other processes, like replenishment, were now integrated. Culture was also a plus: As team members saw their colleagues picking faster and with more accuracy, they wanted to be part of the process. "We generated some excitement," Bhuthadia says. "When we finally rolled it out, the feedback we got was that team members liked voice because they were better at their jobs."

Moving forward

As noted earlier, once voice was rolled out, picking efficiency in Auckland rose by 25% and accuracy reached 99%. Looking at voice as "a move tool" and not just a picking tool, it has been extended into processes besides picking, such as replenishment.

It also generated buzz outside of Auckland. Mainfreight publishes statistics across its facilities every week, and Bhuthadia's peers at other facilities took notice of what was happening in Auckland. Today, Mainfreight is running voice in 10 sites in Australia and New Zealand. Facilities in other regions, like the United States, are considering the technology (See box. p. 18).

More importantly, it is delivering the type of big change Mainfreight had targeted to drive meaningful continuous improvement. "It is that transformational change we were looking for," Bhuthadia says. "Voice has allowed our business and our thinking about technology to step forward." □

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Amid some regional and demographic shifts, the compensation picture continues to improve in step with job satisfaction.

8TH Annual SALARY

Satisfaction and stability

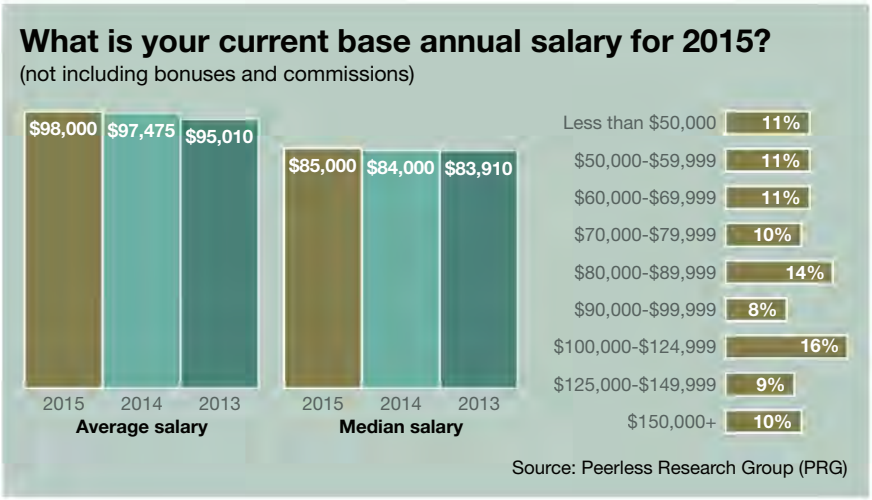
By Josh Bond, Senior Editor

The results of *Modern*'s 8th Annual Salary Survey show that veteran materials handling professionals continue to thrive, even as signs begin to emerge of a younger cohort entering the talent pipeline. While businesses work to attract new professionals, they are steadily rewarding those who have been loyal.

At just a few hundred dollars above last year's record, the average base salary of $98,000 (median $85,000) is the highest in the eight years of our survey. The average of salaries and benefits combined rose 2.2% in 2014, following the nearly 7% jump reported in 2013. In 2015, average overall compensation rose 4.7% and satisfaction is still nearly perfect, including 72% who say they are very or extremely satisfied with their jobs.

Similarly, 93% would recommend the materials handling profession to others. Their efforts might have contributed to an apparent influx of younger respondents. The average age is now 46 years, a significant drop from the 51-year-old average the survey has reflected for at least the previous four years.

SURVEY



Last year, 65% of respondents said their salary had increased in the previous 12 months, but this year that figure is at 72%. And 2.5%—the lowest since the recession—reported their salaries had decreased, and 5% fewer respondents' salaries (26%) stayed the same. In 2014, the average base salary increase was 4.6%, dropping below the 5.2% averages of previous years. They have since returned to 4.9% (median 3%). Of those respondents whose salaries increased last year, 17% received increases of 5% to 9%, and nearly one in 10 saw raises of 10% or more.

There is more good news about the frequency of dramatic cost-saving measures like layoffs and pay cuts, which continue to fall since the highs of 2011. Only one category has increased since then, as this year's survey shows a slight uptick in the number of respondents who have experienced reduced overtime. Hiring plans also slipped for the first time in years, dropping 1% from last year's 63% who reported their company added personnel in the prior 12 months.

Going forward, 46% of our respondents expect to finish their careers with their current employer, down slightly from 50% last year. About 52% have already been with their employers for 10 years—including 26% who boast more than 20 years of tenure. However, the average turnover rate jumped to 8.7%, having spiked to 7.8% last year after hovering around 6.5% for the previous three years.

The compensation picture

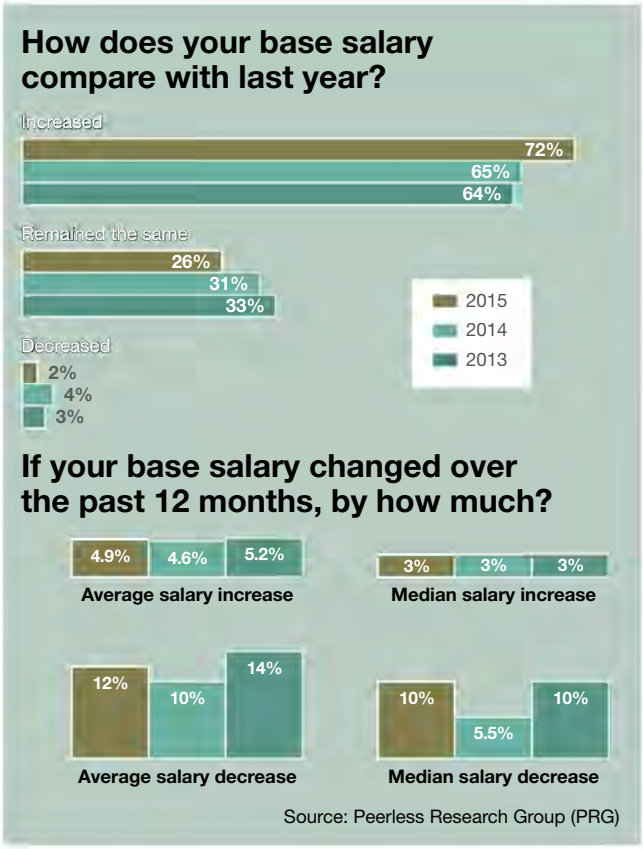
Since the economic recovery, bonuses have been rewarded more for individual performance, and 28% of respondents with bonus or commission plans said those increased by an average of 27%. This marks four consecutive years of bonus increases greater than 20%, and the average bonus now sits at $24,010 (median $5,000).

When asked for the factors upon which their bonuses are based, 49% cited personal performance, the highest in the survey's history and up 4% from 2014. Respondents reported virtually unchanged results for bonuses based on whether the company reaches goals (67%) and increased sales (29%), but rewards for better inventory management dropped by 5% to 10% and lower operational costs were a factor for only 22%, down 4%.

Demographics

About 8.2% of respondents work for companies with estimated 2015 revenues of less than $10 million. Another 20% are at companies between $10 million and $50 million, and nearly half are at one larger than $250 million, including 24% above $2.5 billion.

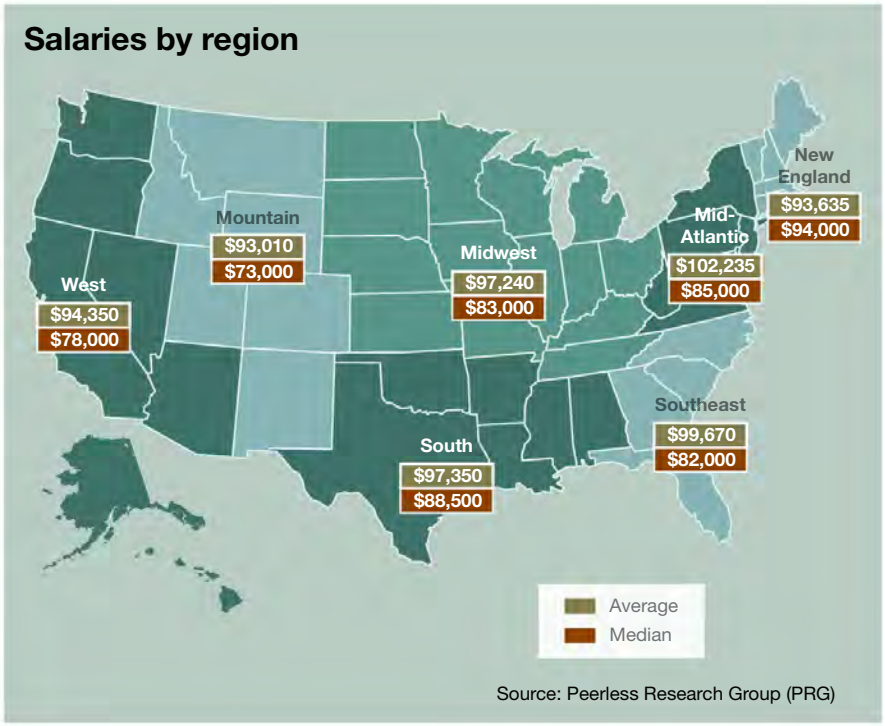
Respondents represent industries including food, beverage and tobacco (11%); industrial machinery (8%); wholesale trade (7%); retail trade (7%); chemicals and pharmaceuticals (6%); paper and printing (4%); computers and electronics (4%); and



transportation and warehousing services (4%). Primary job functions of respondents include warehouse, distribution and logistics (38%); plant management (16%); engineering (19%); company management (9%); and purchasing (8%).

Fewer than 21% of respondents have been in the materials handling profession for less than 10 years, and 58% have been at it for more than 20 years. Last year, the survey indicated 18% of respondents with 30-plus years in the field, a number that has fallen to 13%.

On average, those who have been in the industry less than five years can expect to earn $79,020, up from $71,750 last year. The 2014 survey reflected a 26% growth from the newest cohort to those with 10 to 15 years of experience, but the latter's average salary has fallen to $82,440. Above the 20-years-of-service mark, the average salary continues to hover around $105,000.



The 9% of respondents in company management (CEO, VP, GM, etc.) noted an 8% bump in compensation, to an average of $163,140, following last year's 7% average salary increase. Conversely, the engineers who make up 19% of the survey base saw averages fall yet again to $88,840, shedding 2% after last year's 10% loss. Compensation for plant management positions moved into six-figure territory last year, but has returned to 2013's average of $88,000.

Those with supervisory responsibilities (75%) can expect to earn 13.6% more than their non-supervisor colleagues. The gap between the two was 23% last year, and has been steadily falling since a high of 36% in 2012. The average respondent with budgetary responsibilities oversees a spend of $200,000 (median: $16,000). They will earn about 25% more than those without budgetary authority, a gap that has also shrunk from last year's 37%.

In the 2014 survey, the average supervisor salary slightly decreased and was met with a 2.6% increase in non-supervisor salaries. The trend has continued in 2015, as supervisor compensation fell slightly and non-supervisor salaries grew by 8%.

Average salaries are bucking historic trends in certain regions of the United States. In the Midwest, where 39% of respondents are located, salaries fell by about 3% from 2012 to 2013, only to spike by nearly 9% in 2014. This year the average is 1.3% higher at $97,240. In the mid-Atlantic region, home to 17% of respondents, the average salary jumped 6% to $102,235.

In the Southeast, where 14% of all respondents are employed, average salaries have returned to 2013 levels at $99,670 after an anomalous drop in 2014 to $87,300. Salaries in the South saw a big boost between 2012 and 2013, and held flat last year at about $92,000. In 2015, the South's average added 6% to reach $97,350. In the West, where one in 10 respondents resides, average salaries shed more than 6%, the first decrease since 2012.

Job satisfaction

Once again, 16% of respondents express "extreme satisfaction" with their careers. The percentage of those "very" or "somewhat satisfied" shifted slightly to 56% and 26%, respectively. Today, only 1% are "not very" satisfied, and 1% are "not at all satisfied."

Respondents, by the numbers

In October 2015, *Modern Materials Handling* subscribers received an invitation by e-mail to participate in the annual salary survey. The e-mail included a dedicated URL linked to a Web site that hosted the questionnaire. The study, performed by Peerless Research Group, received a total of 401 responses from qualified materials handling professionals.

The average respondent earns $98,000 in salary, which is level with last year but up from less than $90,000 in 2012. Bonuses, on the other hand, have jumped to an average $24,010 from around $19,000 last year. Median salaries and bonuses have held level since last year's survey.

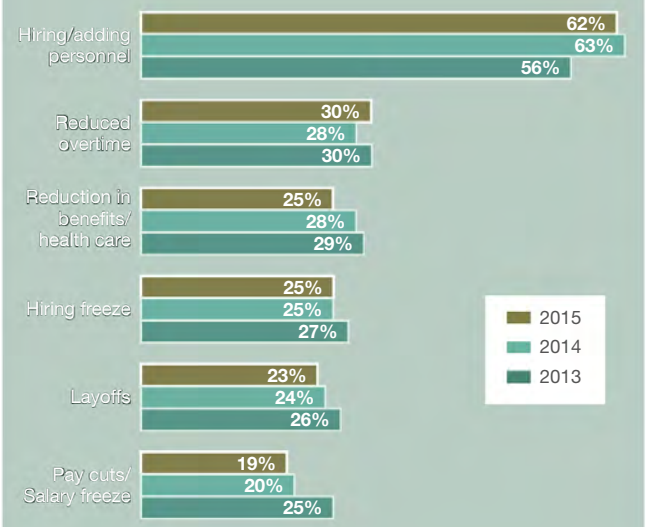
The average respondent is a 46-year-old, a significant drop from the 51-year-old average the survey has indicated for at least the previous four years. He has worked with his company for about 10 years of his 17-year materials handling career, during which time he has worked for 2.5 companies. About 68% of respondents work for manufacturing companies. The average respondent works for a company with with 3,253 employees and an estimated annual revenue of $842 million.

In addition to an influx of young talent, females continue to hold a record 12% of materials handling positions. The average base salary for women also spiked from $73,560 in 2014 to $90,400, an increase of more than 20%. That number had dropped from $76,242 in 2011 to $66,635 in 2012 and only slightly more in 2013, but now stands at a record high.

Among respondents, 80% have been in the industry at least 10 years, 49% for more than 20 years, and 13% have been at it for more than 30 years, 5% less than in last year's survey.

Only 7% of respondents were personally impacted by layoffs in the previous 12 months, which matches the record low of the last five years.

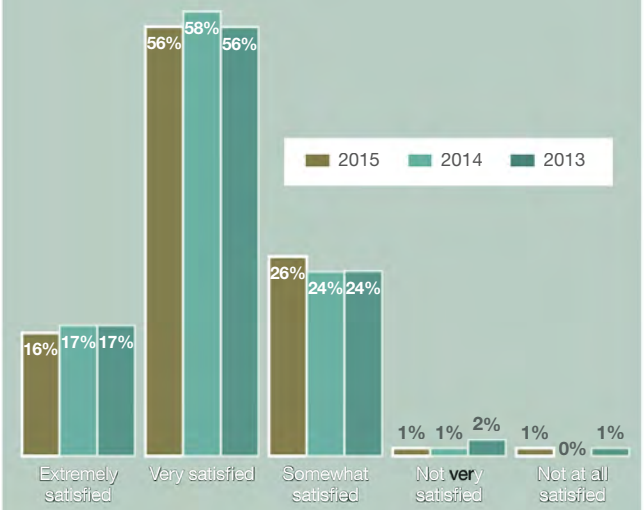
Has your company experienced any of the following during the last 12 months?



Source: Peerless Research Group (PRG)

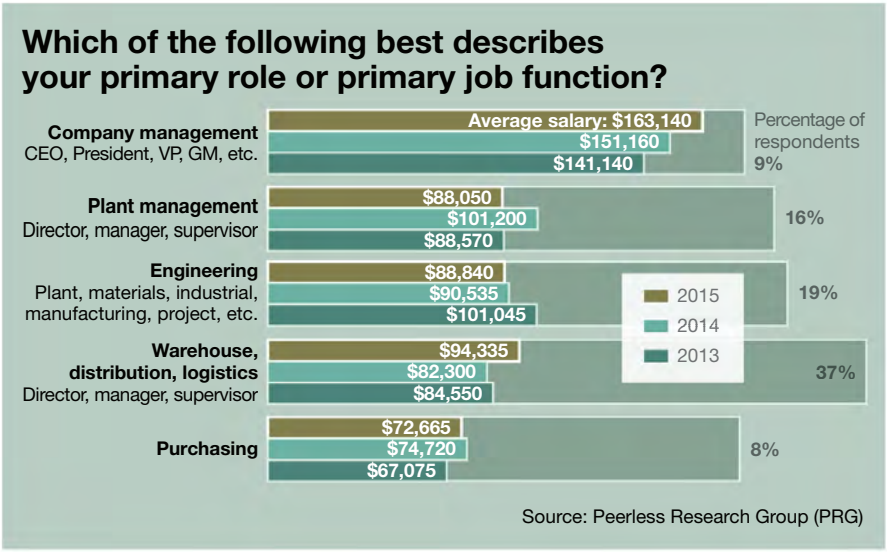
This year, 32% of respondents indicate no interest in seeking another job, the lowest in five years. About 40% say they are "always open to other possibilities." The same 20% as last year are passively looking for work elsewhere and the same 7% are actively looking. Those looking elsewhere are motivated primarily by compensation (61%), the desire for new challenges (40%), and a lack of advancement opportunities (38%).

In general, how satisfied are you with your career in materials handling?



Source: Peerless Research Group (PRG)

When asked about stress levels at work, 45% say it is more stressful than two years ago, and 42% say stress levels have remained the same. Among the 10% who report their job is "extremely" stressful and the 32% whose work is "very" stressful, the top complaints included workload (48%), lack of staffing (45%), balancing work life and home life (40%), questionable management decisions (39%), lack of enough time to get the work done (37%) and working with outdated technologies (28%). ☐



They don't just do it for the money

Open-ended responses from survey participants highlight the pros and cons of the profession.

Why would you recommend the materials handling profession to others? (95%)

- Warehousing, transportation and materials handling have been my profession for more than 36 years, and I have enjoyed the challenges and the rewards. I have been involved in all aspects of this industry and would recommend it to anyone looking for a challenge in an ever-changing industry.
- Materials handling is critical to companies' performance and bottom line.
- This kind of job is exiting and dynamic. It's for people who like to be challenged every day, people who don't like routine. I love what I do.
- If you like a fast-paced work load with a great deal of variety and challenges, this is a good career field.
- It's exciting and never boring. Materials handling is a good industry, and there's always a job somewhere.
- There is a limited pool of professionals, so there's lots of opportunity.
- It's been a great career for me, and I enjoy what I do.
- Customer service is the key factor, and I thrive on helping customers solve their problems.
- It is a great industry that is an important player in the logistics sector, with plenty of growth potential.
- Distribution can't be sent offshore.
- It's a great career with opportunities for many types of personalities and needs. It requires people who are analytical, process-oriented, and technology-oriented. It also requires a great deal of creativity, adaptation, broad vision and narrow focus—all at the same time.
- I love the dynamic; you really need not only the ability to analyze but also the ability to engage with people.

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Silo-busting in supply chain execution

Use of TMS and WMS are moving to a more concurrent, less fragmented environment as part of new approaches to supply chain execution.

By Roberto Michel, Editor at Large

FOR ALL THE TALK about using logistics as a means of competitive advantage, the systems that companies rely on for supply chain execution are often only loosely integrated. As a result, disciplines such as transportation planning and warehouse management often still get done in serial fashion and without knowledge of how constraints in one domain will impact the other.

This disconnect between systems for supply chain execution is beginning to change, however, as providers of supply chain execution software such as warehouse management systems (WMS), transportation management systems (TMS), and route planning and scheduling solutions look at ways to break down silos between systems. With pressures like item-level order fulfillment growing as part of the omni-channel trend, the shift to supply chain execution (SCE) in which different disciplines work in a more concurrent, connected fashion is seen as a must.

"I believe there is no question that WMS and TMS should be tightly integrated," says John Reichert, senior director of SCE solutions for TECSYS. "There should not be a line between the two areas. Ideally, you want them to blend together."

With select transportation functions blended into WMS, explains Reichert, it's possible to do things like have WMS users generate and work with carrier compliant labels from within the WMS. A supplier with an integrated solution can also do things like pass route schedules up to a WMS so that the system's wave management logic can take into account the way goods should be staged and loaded for delivery route stops, while still keeping picking efficient. "The best answer sometimes comes from letting WMS and TMS applications work together to optimize a combined process," says Reichert.

The market is headed toward integrated platforms for execution functions, believes Dwight Klappich, a research vice president with analyst firm Gartner, even though overall, most suppliers still have a considerable way to go before applications work tightly together at a process level. What's more, end-user organizations are putting more focus on the overall order fulfillment process.

For example, says Klappich, transportation plans used to be devised at a corporate level by a few planners and then handed down to the distribution center level for execution. But

today, vice presidents of supply chain are much more apt to urge planners to think about constraints at the DC level, and conversely, for managers in the DC to think about transportation priorities. "Companies are starting to view logistics more holistically instead of thinking in silos," says Klappich.

Will Salter, CEO and president of Paragon Software Systems, a provider of route planning and scheduling software, has witnessed a shift in the use of his company's software. Route scheduling was once practiced by a few planners on PCs, but today, these solutions can be deployed centrally on servers and can easily push metrics on delivery performance to managers in customer service or DC operations. "The systems we have today generate information that permeates the whole organization, not just those few in the transportation office," Salter says.

So what will better integration do for DC operations? The practical benefits include quicker pick, pack and ship processes; streamlined carrier compliant labeling; as well as better alerting around events like dock availability and truck arrivals/departures to avoid delays or added costs.

Basic data flows

There is no great mystery to the data flows between TMS and WMS. In many companies, though not all, orders come in through an order management or enterprise resource planning (ERP) system and are sent to a TMS for load planning and carrier selection, and then the planned loads are sent to WMS for execution. After trucks are loaded, the WMS reports back to the TMS the details on what was loaded.

Further integration points beyond this basic data flow vary depending on the industry involved and the level of sophistication of the WMS and TMS solutions, says Stacy Kannawin, vice president of transportation for 4SIGHT Supply Chain Group, a consultancy that helps companies with supply chain integration. In some industries, such as automotive or suppliers making frequent deliveries to a lean or just-in-time manufacturer, integration may need to be more involved. "The tighter the lead times are in a supply chain, the tighter the integration needs to be," says Kannawin.

Alerts or status updates might need to be passed between the WMS and TMS around events like dock appointment schedules, carrier delays, stop sequences for deliveries, gate in/out status in yards, or times for when trucks arrived or pulled out of dock doors, says Kannawin. Carrier dispatch offices traditionally have provided some of this information manually,

but she adds, "What tends to work best is that the carrier reports information through dispatch, but then there is verification through system processes."

Cloud-based WMS vendor LogFire recently partnered with Oracle to integrate its WMS with Oracle's cloud-based TMS for users wanting a combined cloud solution for execution. The key integration points for that partnership are inventory items, sales order lines and customer data, according to Joy Clay, a solutions director with Inspirage, a consulting firm that led the integration work using its Rapid Start for Oracle transportation management cloud process.

The partners are in the process of fleshing out industry-specific integration scenarios, adds Clay, but the key points of integration are finalized and available to users. "Sales order plans are built and Oracle routes those plans as trips, and then those trips can be passed back into LogFire for picking," he says. "Upon ship confirmation, data is logged back into Oracle transportation so that customers can see actual shipment locations and costs."

SCE software suppliers such as Manhattan Associates, JDA, HighJump, and TECSYS offer suites that span WMS, TMS and other execution functions. Yard management solutions from major suppliers can also act as a bridge between warehousing and transportation processes. However, Klappich notes, not all of the major best-of-breed execution vendors have evolved their respective product suites into a highly cohesive platform.

The more advanced levels of supply chain execution integration, or what Gartner calls "supply chain execution convergence," will synchronize and then optimize processes between domains, says Klappich. This level of platform integration requires not only a common data model for details like items, customers or locations, but also a layer of software logic that balances constraints and resources for each execution function. For example, if TMS wants to combine three customer orders onto one load, but one of the orders will take much longer to prepare because it requires more value-added services, the TMS needs to know this warehouse-level constraint. "It's about being able to simultaneously consider resources and constraints in both WMS and TMS," says Klappich.

Where it counts

For many warehouse operations, the biggest benefit of tighter integration to TMS is in smoothing out and eliminating steps in the final pick, pack and ship processes, says Reichert. With TECSYS's WMS solution, certain TMS functions are available from within WMS so users can do things like generate carrier-compliant shipping labels in picking areas and pick straight to the final shipping package. Some TECSYS users even generate a combination label that has the carton label in one area and the carrier label in another, thus streamlining the process.

Demand management: Execution's upstream integration challenge

Not only are omni-channel pressures driving a need for better integration between warehouse and transportation management processes, omni-channel complexity is also driving the need for a better linkage of demand planning with supply chain execution. For the most part, this is being done with business process adaptations rather than software integration that automatically merges the two areas together, explains Santhosh Kumar, vice president of industry solutions and technology with Intrigo, a consulting firm with expertise in demand and supply chain planning.

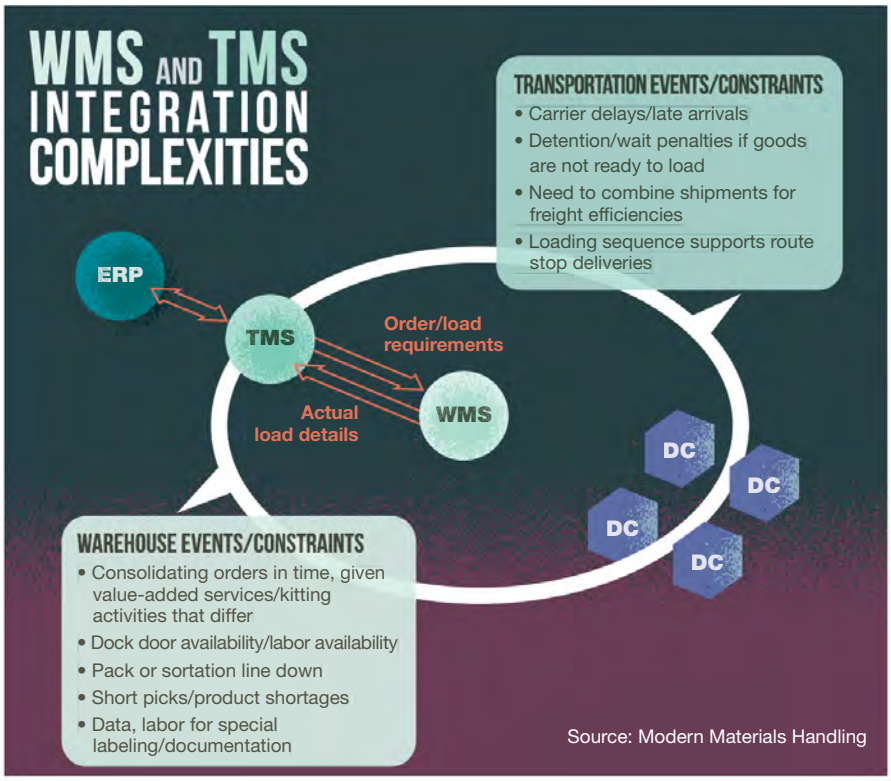
Demand planning practices are evolving around e-commerce, Kumar explains. Many companies in the consumer goods sector still do demand planning on a monthly basis and forecast for their e-commerce channel as part of monthly planning. But to build more reliability into supply availability for e-commerce demand, some companies have begun to do weekly "virtual allocations" of inventory on hand across DCs and other inventory expected from suppliers.

"Demand planning *per se* still typically takes place on a monthly basis, but what we see more companies doing is using the concept of a virtual segregation of inventory for different channels," Kumar says. "It's like an allocation that you do on a weekly basis that addresses, by channel, how you will ensure that sufficient supplies will be available, and you earmark that inventory on a virtual basis."

One challenge with this practice is that if a major retailer suddenly needs thousands of additional units of an SKU for its stores, a manufacturer is under pressure to meet that request, says Kumar, even if it throws the virtual allocation of inventory out of whack. However, with the growth of e-commerce generally, and more senior executives focused on e-commerce, demand and supply planning for e-commerce is becoming more independent and more rigorous.

"The mindset is slowly changing," says Kumar. "Companies have executive positions at the e-commerce level who have their own forecasts and are driving a look at demand independent of the other channels."

However, Kumar adds, many companies still have separate systems for demand management, transportation management and warehouse management, with no direct integration from demand management into warehouse management. As a result, much of the coordination between demand planning, order confirmation and supply chain execution comes down to using business intelligence and reporting tools, and communication between departments, says Kumar. "There is a reporting element involved," says Kumar. "When it comes to deployments and what companies have in place, the integration is not system-driven yet."



The basic data exchange between TMS and WMS typically centers on load requirements "down" to the WMS from the TMS, and actual shipment details back to TMS. But, there are various constraints that complicate real-world execution.

However, adds Reichert, to support integrated labeling, the WMS should be able do things like be able to void a transaction in the event that a short pick occurs and the label needs to be redone. "The ability of the WMS to automatically detect exceptions like a short pick and automatically void and recreate a transaction without having to touch the TMS directly becomes important," says Reichert. "Our solutions interact dynamically so that any exception in WMS that requires a TMS action just gets handled in the background as communication."

Additionally, Reichert says, with more DCs using "on-demand" packaging systems that customize boxes for shipping, integrated WMS and TMS allows data about the boxes being constructed to be accessible to both systems.

Integration also makes it possible for a WMS to "learn" from data collected in TMS functions such as delivery management, says Reichert. TECSYS' integrated functionality, he says, can take customer feedback information collected in TMS-level delivery management, such as missing or damaged items noted by customers, analyze if there is a likely cause in the warehouse, and highlight any recommended WMS-level procedures that could help avoid the same problem on future orders. The system might even give pickers or packers a visual cue on how to identify certain items, or how to pack them more safely. "If you don't have tight integration all the way back to WMS, you lose that opportunity to present useful information back to the pickers," Reichert says.

Broader SCE links

Not only do vendors see TMS working in close concert with WMS, there are other silos that providers are trying to break down. One of these is on the demand side (see box, p. 34), where greater complexity around e-commerce complicates demand planning and the preparation of warehouses to effectively fulfill expected demand.

Another area where vendors are seeking to break down silos is between route scheduling and real-time fleet monitoring. Salter says Paragon's Fleet Controller module does this by linking with vehicle tracking and telematics systems, and comparing the actual progress of vehicles and delivery performance with planned routes, giving users a way to monitor and react to each day's delivery performance as it unfolds. With a combination of Fleet Controller and Paragon's route scheduling solution, users are able to do things like see exactly how close drivers are at hitting delivery windows, measure the dwell time at each stop, or know whether drivers deviated from planned routes.

This blending of what was planned with real-time delivery progress can help improve routing and scheduling, says Salter. "You can analyze the different things that have happened on routes that don't go right and feed that information back into the [route planning] system," Salter says. "So the system is always learning from what unfolds each day. It's like a self-calibration."

This new world of integrated solutions that break down domain silos may sound encouraging, but as Klappich warns, while certain vendors are ahead of others with supply chain execution convergence, many solutions in place lack the more advanced levels of integration. "It's still a work in progress in terms of integrating the process flows between these applications so it's seamless," he says. ☐

Companies mentioned in this article

- 4SIGHT Supply Chain Group
- Gartner
- Inspirage
- Intrigo
- Paragon Software Systems
- TECSYS

Protecting workers *at the* loading dock

From black-and-yellow safety striping to integrated dock safety systems—and everything in between—here's how to shore up a warehouse loading dock to ensure a high level of worker and driver safety.

By Bridget McCrea, Contributing Editor

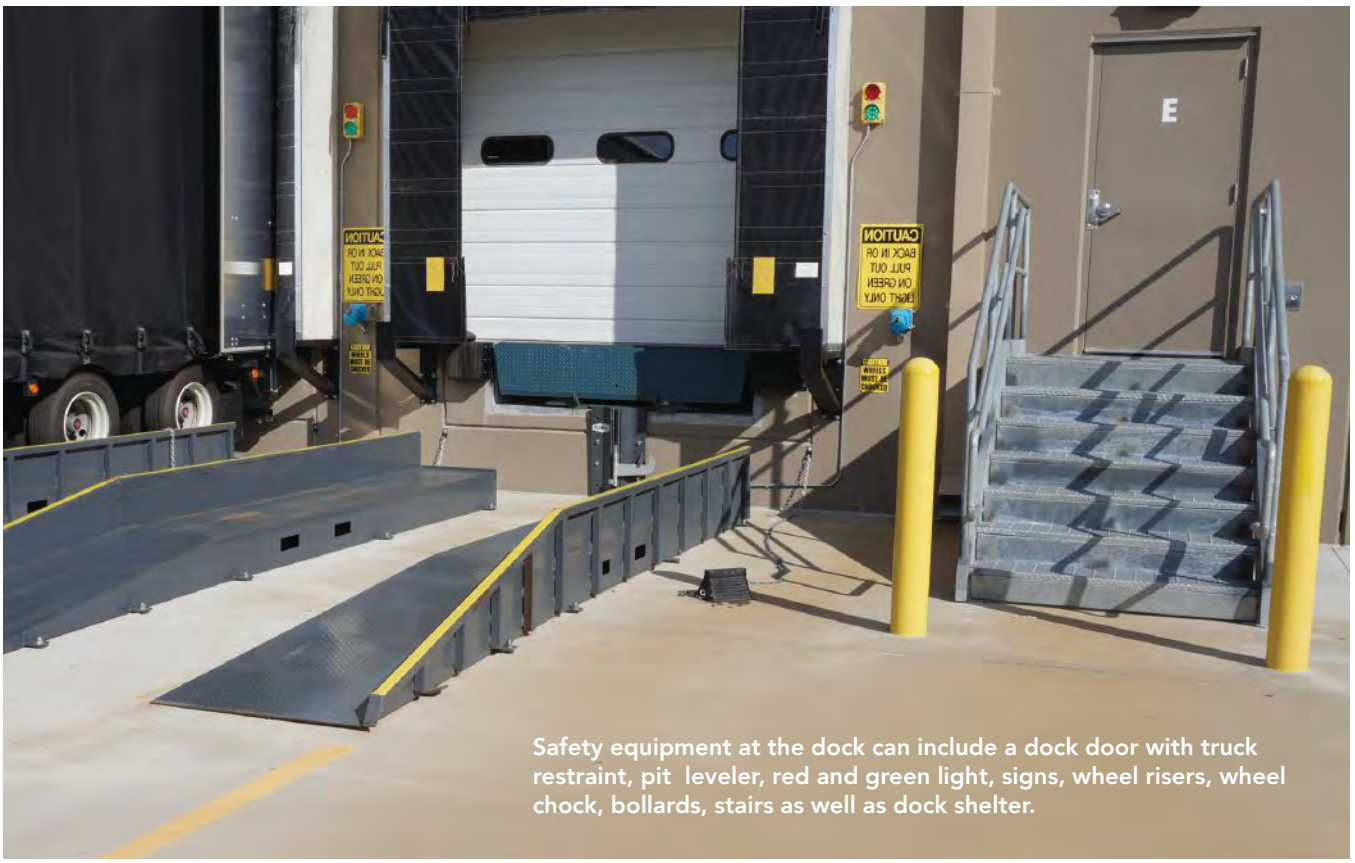
THE WAREHOUSE OR DC LOADING DOCK can be a pretty dangerous place. For proof, you only need to look at OSHA's most recent dock-related accident report, which includes accounts of workers fracturing their legs after being struck by dock plates, getting crushed between a truck and a dock, sustaining fractures after falling off the dock, driving forklifts right off loading docks, and worse. Most of the time, OSHA says the culprits in such situations are forklifts running off docks, products falling on employees, or equipment striking someone—all of which are avoidable with good safety policies (for example, no "dock jumping" or backing up a forklift right to the dock's edge), equipment and modern technology.

"The dock is the one area of a warehouse—excluding machinery—where people can get seriously injured," says Dan Jones, vice president of sales and marketing for Pioneer Dock Equipment. "It's one of those places in the building where simple neglect can cause serious injury."

The individual who takes a 50-inch fall after walking through an open door, for example, can sustain significant damage to his or her body. Drive a forklift off the same drop, says Jones, and the results could be much worse. "I have a friend who was in that situation and had his chest crushed by the forklift," recounts Jones. "He survived, but it really banged up his body and is now on long-term disability as a result of that accident."

And as if the physical structures and equipment that can inflict injury at the dock weren't enough, companies across all industries are operating with a newer and faster mindset when it comes to distribution. Add e-commerce and omni-channel to that mix, and you wind up with the proverbial accident waiting to happen.

"Dock safety is always an issue, but now everyone is operating at warp speed, trying to produce faster inventory turns," says Walt Swietlik, director of customer relations and sales support at Rite-Hite. "It's dangerous and people can get careless. Unfortunately, even the occasional mistake can be catastrophic or life-threatening."



Safety equipment at the dock can include a dock door with truck restraint, pit leveler, red and green light, signs, wheel risers, wheel chock, bollards, stairs as well as dock shelter.

Operating at warp speed

With the "need for speed" making an impact on warehouses around the globe, Jones says some workers will do anything to meet their quotas and inventory turn requirements.

"There are some industries where certain workers are paid by the number of items that go out the door," Jones explains. "I've been in warehouses where people have taken the governors off their forklifts in order to drive faster. The problem is that getting stuff out the door quickly can also contribute to severe injuries when the right safety protocols aren't in place."

So how can a warehouse or DC manager avoid these issues and ensure the safest possible experience at the loading dock? Jones says using restraining devices on trucks and other vehicles is a fundamental step that shouldn't be overlooked.

"Everyone should be chocking their wheels, but sometimes drivers don't do this or the chocks are worn out," says Jones. Using manual, electric or hydraulic truck restraints, workers have a better chance of capturing the trailer should it break free or roll away. Add an indicator light system to the equation (green for good, yellow for caution, and red for warning), says Jones, and the truck driver, lift truck operator and dock workers will be able to determine whether it's safe to enter or operate the vehicle.

On the dock itself, overhead doors, dock levelers, dock seals and canopies can help keep accidents and injuries to a minimum. A fixed dock leveler, for example, gives lift truck drivers an easier and safer route in and out of the trailer, while a shelter or seal helps keep out the elements and also helps keep the forklift from sliding or losing traction.

"In our plant, we use shelters because we don't heat or cool the building," says Jones, "but we want to be able to protect our forklift drivers. So, a truck backs in and the structure will shelter the driver as he drives on and off the vehicle."

Guardians of the dock

Falling off a dock—even if the actual fall distance is minimal—can inflict significant damage on the human body. Cory Thomas, senior guarding product specialist at Wildeck, says putting up guardrails in an open or pit area is a good way to keep such accidents to a minimum.

"A lot of injuries occur when people aren't paying attention and a forklift falls off the edge of the pit," says Thomas. "By putting up a protective barrier or guardrail, you can help cut down on the accidents, worker's compensation claims and equipment downtime."

On the dock, guardrails also provide visual cues to workers who may not otherwise recognize the potential hazard—much like highway guardrails protect drivers and make them aware of road edges, change in terrain or upcoming obstacles. Folding/portable gates can be used to set up temporary or permanent areas where hazards lurk, says Thomas, and "prevent people from falling off or entering dangerous areas."

A loading dock safety gate helps protect personnel and equipment from falling off wide truck pits and loading docks.

Rite-Hite's Swietlik says the "drive approach" is another area that warehouse managers should be thinking about when developing safety protocols. "There seems to be an increase in the number of truck drivers that are not seeing the pedestrians," he explains, "who are out on the drive approach chalking the wheels, opening the trailer doors for the truck, or just going outside to acknowledge the trailer and fill out the paperwork with the driver."

In these situations, Swietlik says safety clothing such as reflective vests combined with integrated loading dock systems can help avoid serious problems. With such systems, he says the dock leveler, dock door and dock lock are all controlled from the inside of the warehouse or DC, thus negating the need for the pedestrian to go outside and into the "drive approach" space.

"We're seeing a lot of interest from companies that want to minimize the number of people who are outside of the building," says Swietlik, "specifically in and around the loading dock."

Keeping it in the lines

Not all dock safety protocol and procedures have to involve expensive equipment and integrated systems. In fact, one of the easiest ways to help ensure worker safety at the loading dock involves a few rolls of black and yellow safety striping or, a can of paint, a paintbrush and some masking tape.

"Use the striping to indicate where the vehicles can go, where the dock equipment is, routing guidelines and so forth," says Jim Galante, director of business development at Southworth Products Co. "This is one of the simplest ways to provide visual warning signs for workers, and it's a constant reminder of the hazards that exist in certain areas of the dock and warehouse."

As an added measure, Galante suggests re-painting or reapplying the visual cues every one to two years to ensure good visibility. And speaking of visibility, Galante says warehouse and DC managers should also inspect their current dock illumination techniques to help truck drivers easily discern where the yard ends and the dock edge begins.

Finally, he says any dock not protected by an enclosure should be treated with a non-skid coating to minimize slips and falls. "Treated concrete is extremely smooth and can get pretty slick when it's wet," says Galante. "With docks that are exposed to water (those found in food processing plants, for example), applying non-skid epoxy or other flooring cover can help ward off potential problems."

Measuring the benefits

Keeping accidents to a minimum on the loading dock isn't always easy or cheap, but the extra effort can pay off significantly. Consider, for example, the

A loading dock barrier is capable of stopping up to 30,000 pounds of force.

Fortune 250 firm that was dealing with a high incident rate in its loading dock area. About 10 years ago, Swietlik and his team worked with the company, helping to overhaul all areas of its loading dock safety protocol.

The effort, time and money paid off for the company. "Over the last 10 years, the company's incident rate has dropped to almost zero," he says, acknowledging the difficulty in "putting a productivity" number on safety. Much like an insurance policy or a fire extinguisher, the real payoff comes when something goes wrong. "One thing is for sure," Swietlik says, "the company's employees feel safer. That, in turn, has helped the workplace's attitude and engagement levels."

Regardless of warehouse size, structure or function, Jones says having a proactive safety culture can go a long way in warding off expensive litigation, lawsuits and worker's compensation claims. "The lawsuits that would result from one dock-related death in a 1-million-square-foot warehouse," says Jones, "would more than pay for everything that needed to be done to make that warehouse safer to work in." □

Companies mentioned in this article

- Pioneer Dock Equipment
- Rite-Hite
- Southworth
- Wildeck

Healthcare distribution: Easing the pain

The modernization of healthcare distribution in many ways mirrors the omni-channel revolution and stands to benefit from similar solutions.

By Josh Bond, Senior Editor

THINK OF INNOVATIVE INDUSTRIES, and you're likely to think of healthcare. After all, the industry continues to develop a pipeline of miracle drugs and miracle procedures like robotic surgery. So, you would think that hospitals, medical device manufacturers, pharmaceutical companies and healthcare distributors would be on the cutting edge of materials handling automation and information technology systems. If so, you might want to think again.

While manufacturing, retail and industrial distribution have been transformed by new business models, like e-commerce, healthcare distribution has not fared as well in the face of regulatory, legislative and economic factors that have conspired to radically transform this industry niche. You've heard the saying that warehousing and distribution are between five to 10 years behind state-of-the-art technology, but many healthcare organizations are starting from scratch.

"The hospital setting has grossly underinvested in terms of supply chains," says Kent Roberts, vice president of business development for Swisslog Healthcare Solutions. There are a variety of reasons for that, Roberts adds. "One customer said historically there was no focus on the cost of logistics. It was all about patient care, and the supply chain was subordinate to doctors and service. Even if they had wanted to manage it, there was little visibility."

Although their supply chains haven't received much attention, that's not to say these organizations haven't been spending. Hospitals have traditionally gone for the big, shiny medical device to attract customers, like robotic surgery or a new MRI machine. "Now the bill has come due on the supply chain side," Roberts says.

The healthcare industry's response reflects the urgency and disruption of the e-commerce boom. In fact, several of the same technologies, methodologies and supply chain principles are poised to shepherd healthcare through its own omni-channel revolution.

Prevention is preferable to cure

Drawing from dozens of interviews, the Health Industry Distributor's Association (HIDA) recently reported that providers expect operating margin declines of up to 30% between 2011 to 2015, including 70% who anticipate declines of 10% to 20%.

The previous mindset for inventory management in healthcare distribution and hospital settings was less "just in time" and more "just in case." After all, when dealing with people's lives and safety, double or triple redundancy is ideal. But in the absence of any meaningful efforts to improve efficiency, costs kept increasing, as most patients are well aware. By the time the Affordable Care Act was passed and Jan. 1, 2018 track-and-trace deadlines were set, the healthcare supply chain was center stage.

"Put bluntly, the credit card statement came in," says Robert Colosino, vice president of marketing and business development for TECSYS. "Until then, everything seemed great in healthcare. They had a TV, sound system and a Porsche in the driveway. It wasn't that the supply chain solutions didn't exist, they just recognized the reality that they can't keep spending like drunken sailors."

Thankfully, there's a legacy of cross-pollination among automation solutions for materials handling in healthcare and warehousing environments. This relationship has positioned the healthcare distribution market to benefit from technologies that have already proven effective in retail and omni-channel distribution applications for many of the same kinds of challenges and objectives.

"People in healthcare distribution often say they're different," Colosino says. "Others say the challenges are essentially the same. I think that although standard supply chain practices should hold true, the fundamental difference that creates a problem is that the point of use has a different mission than profit."

Secure, accurate systems are imperative when handling everything from implants to controlled substances.

To be fair, the modernization of healthcare distribution is much more complex, especially since hospital systems and related manufacturers do not have mature supply chains. Chris DiBernardi, director of business and product development for healthcare at Ryder, cites a study revealing that more than 50% of integrated delivery networks and manufacturers in the healthcare industry have classified their supply chains as immature.

"Our largest retail customer knows cost visibility to the third decimal point, and picking, shipping and shrinkage to the fourth decimal point," Swisslog's Roberts says. "With healthcare, they don't have the benchmarks. If we tell them they can save 30%, they say 'of what?'"

Patients, profits and practice

Roberts identifies five major hurdles that must be overcome if a hospital wants to run an efficient supply chain while reducing costs and improving patient outcomes:

- sourcing,
- inventory management,
- regulatory compliance,
- visibility, and
- analytics.

It's not as simple as replacing hand-counted inventory with RFID tags. Across product categories, each area has a very different supply chain model. Cardiovascular implants are handled differently from orthopedics, which are different than large medical devices and surgical equipment and large molecule pharmaceutical and in vitro test kits.

"A retail store might have 5,000 to 7,000 items," Colosino says, "but a hospital is closer to 50,000, includ-

High-density, goods-to-person technologies are proving valuable in both centralized healthcare DCs and for in-hospital distribution.

ing controlled substances and items implanted in your body, so the tracking required is extreme."

In the retail world, once a product is sold, the transaction is concluded. Collecting data based on patient outcomes, however, is entirely different in terms of informing the supply chain design and evaluating its performance. Furthermore, the scope of the healthcare supply chain has broadened, since it might include home healthcare and non-hospital facilities. Retailers might need to ship items where the customer wants, Roberts says, but healthcare needs products to more dynamically follow the patient's physical location.

Responsive and accurate supply chains must also reach even the most remote parts of the country. Wherever they are, hospitals don't just need more efficient ways of doing what they've always done; they need to achieve compliance while keeping pace with the combination of an aging population and more recognized methods of diagnosis and treatment. The need for system-wide inventory visibility and standardization of these systems between pharmacy and supply chain in every hospital location enables reduction of overhead, decreased waste and improved efficiency.

"There is a lot of potential for customization as healthcare organizations look at new ways of providing patient-specific supplies and medications," says Ross Halket, executive director of automated system design sales at Schaefer Systems International. "Right now, someone stands at the end of hospital hall, pours pills from a big bottle to fill cups with patient doses, and delivers them. If they use five aspirin a month, why buy 500?"

The solution might include a supply chain modeled around a consolidated service center (CSC), where a group of hospitals, related facilities or even home healthcare needs would be served from a large central warehouse. Roberts says these facilities employ many of the same automation and warehouse management systems (WMS) familiar to conventional distribution.

First do no harm

Based on the focus on patient care, doctors and nurses can't be burdened with time-consuming inventory control processes that do not add patient value. By definition, this pushes much of the complexity of distribution out of the hospital environment. Halket says the options and preferences for healthcare organizations are all over map in terms of where product is stored and shipped.

The healthcare supply chain often consists of two main subsets, Colosino says: handling before the hospital and inside it. Each has a distinct set of limitations and they must work in harmony, but there are no hard and fast rules about where a given function should be performed. Kitting, order consolidation and timely, patient-specific fulfillment activities might occur in mini-DCs on each hospital floor, upstream in an off-site CSC, or through a 3PL.

"Some want in-sequence, patient-ready products delivered to the hospital floor, others want wing-specific delivery," Halket says. "There's a new approach at a central fill facility where sequenced items are pre-packaged and delivered in a tray that fits in a cart that is wheeled down a hospital aisle with a put-to-light system for those drop-offs."

Adam Brown, market development director for Dematic, says some facilities are working to expand and centralize mini-DC functions from floor-level operations to denser and potentially automation-friendly applications. Other facilities are removing many mini-DC functions from the hospital.

"Both self-distribution and 3PL-supported supply chains are looking for more granular data on tracking units of use," Brown says. "Whether it's an IV bag or five gauze pads, if someone has to walk into a patient's room and give them something, we hear wishes for solutions that could charge items to the patient's account as they are carried through the door."

For now, it is best to target some common practices, including any paper-based picking with order accuracy and inventory problems. Brown says this ultimately comes down to shaping software to the specific environment. "If you do not start with an IT-centric program, whether you pick manually or not, you will need back-end systems to track, plan and administer those orders properly and accurately."

Amid the scramble to meet the needs for efficiency throughout the supply chain and ease at the point of use, every player in healthcare distribution is working to protect or expand their revenue streams while picking the abundant low-hanging fruit in their customer bases.

"Wholesalers are looking to break into that business in a big way and take it away from traditional hospital wholesalers," Halket says. "Companies that were once pharmaceutical wholesalers now want to be pre-wholesale, or provide central fill and other specialty services. They're all trying to get into each other's business. The advantage might be to the wholesalers, who understand the risks of investing in automation as opposed to hospitals, which are much more risk-averse and wonder what the impact might be."

Consumable inventory had escaped scrutiny until recently when the costs of stockpiling "just in case" became unsustainable.

A speedy recovery

For those hospitals considering CSCs to promote supply chain efficiency, risk aversion is common for greenfield projects and modern technologies, but it is more pronounced in established facilities, according to Rich Riemer, vice president and principal of Southwest Solutions Group, a certified installer for Kardex Remstar. For all the past excessive spending in the name of improved care, some corners of the industry have been outright neglected, he says.

"One of the largest untapped opportunities is in the pathology department, where samples of biological material accumulate in incredibly outdated storage systems," Riemer says. "There are metal drawers that are cramped and disorganized and don't preserve sample integrity. No patient wants to hear that the biopsy was no good, and they need to schedule another."

In addition to storage, transportation systems must protect samples as they move from facility to facility. To offset freight costs, a hospital might tap its existing network of hospital-owned trucks that ferry specimens and supplies to manage other product movements and deliveries. But the nature of healthcare distribution calls for a range of product velocities and responsiveness.

"Some CSCs are not like any other centralized distribution," Riemer says. "There's a lot of pallet movement, a lot of hand-picked items, and extensive geographic logistics to provide on-time delivery. They often start picking at 4 a.m. before sending vans out at 9 a.m."

Hospital DCs are therefore investing in automation like goods-to-person systems to enable speed and accuracy in these environments. As acquisitions and centralization continues, organizations will also find the economies of scale to justify automation. For the foreseeable future, consolidation will be prevalent, as evidenced by the recent news of Walgreens' plans to acquire Rite-Aid. Among large and small players in the healthcare market, uniting supply chains often means reckoning with redundancies.

One of the main end goals is standardization, Roberts says. Gloves are a common example. If each entity acquired by a growing hospital network had a set of gloves it liked, suddenly the network finds itself stocking 37 kinds of gloves when they really only need five. A CSC can uncover duplication and facilitate a standardized SKU set, Roberts says, but it's important to have clinician buy-in.

"A doctor might object and say these seemingly small decisions are putting patients at risk," he says. "If they get together with the 37 gloves and are asked how best to trim that, everyone will get better results. This might even include direct collaboration between supply chain folks and clinicians." ☐

Companies mentioned in this article

- Dematic
- Ryder Logistics
- Schaefer Systems International (SSI)
- Southwest Solutions Group, a Kardex Remstar installer
- Swisslog
- TECSYS

20 TOP 3PL AND PUBLIC REFRIGERATED WAREHOUSES

By **Josh Bond,** Senior Editor

The 2015 public warehousing market continues to chart steady gains and ongoing consolidation.

EACH DECEMBER, we take a break from looking at what's going on inside the four walls of the world's warehouses and distribution centers and consider the sheer square footage managed by the top third-party logistics (3PL) warehouses and public refrigerated warehouses. And again this year, that space is growing.

Following last year's 4.4% growth in square footage, the biggest global third-party logistics (3PL) warehouses now manage 3.3% more space. These are among the findings of an annual ranking of the Top 20 3PL warehouses supplied to *Modern* by Armstrong & Associates, a consulting firm specializing in logistics outsourcing. Dick Armstrong, chair of Armstrong & Associates, is forecasting continued modest growth in 2016.

Top 20 3PL warehouses, 2015

2015 Rank	2014 Rank	Third-party logistics provider (3PL)	Headquarters	Warehouse space 2015 (millions of square feet)	Warehouse space 2014 (millions of square feet)	No. of warehouses (2015)	No. of warehouses (2014)	Web site
1	1	Exel (DHL Supply Chain - Americas)	Westerville, Ohio	109	109	534	534	exel.com
2	4	Americold	Atlanta, Ga.	42.5	34.5	177	177	americold.com
3		Norbert Dentressangle US	Clive, Iowa	40	n/a	146		norbert-dentressangle.com
4	2	GENCO ATC	Pittsburgh, Pa.	37	36.5	130	140	gencoatc.com
5	3	Ryder Supply Chain Solutions	Miami, Fla.	35	35	233	233	ryderscs.com
6	5	CEVA Logistics Americas	Houston, Texas	33	33	164	164	cevalogistics.com
7	7	OHL	Brentwood, Tenn.	32	32	130	130	ohl.com
8	8	Kenco Logistic Services (KLS)	Chattanooga, Tenn.	31	31	90	90	kencogroup.com
9	9	UPS Supply Chain Solutions	Alpharetta, Ga.	28	28	599	599	ups-scs.com
10	10	DB Schenker Logistics Americas	Freeport, N.Y.	27	27	82	82	dbschenkerusa.com
11	11	UTi Worldwide	Long Beach, Calif.	26	26	230	230	go2uti.com
12	12	Neovia Logistics Services	Downers Grove, Ill.	24	24	112	100	neovialogistics.com
13	13	NFI Logistics	Cherry Hill, N.J.	23	22	109	74	nfiindustries.com
13	13	DSC Logistics	Des Plaines, Ill.	23	22	52	49	dsclogistics.com
14	15	Menlo Worldwide Logistics	San Mateo, Calif.	21	20	138	138	menloworldwide.com
15	16	Penske Logistics	Reading, Pa.	19.1	19.1	105	105	penskelogistics.com
16	17	Saddle Creek Logistics Services	Lakeland, Fla.	16	16	41	37	sclogistics.com
17	18	Kuehne + Nagel, (The Americas)	Jersey City, N.J.	15.1	15.1	75	75	kuehne-nagel.com
18	19	syncreon	Auburn Hills, Mich.	15	15	95	95	syncreon.com
19	20	WSI	Appleton, Wisc.	14	14	52	52	wsinc.com

Source: Armstrong & Associates

Based on the latest news and numbers, next year seems unlikely to produce many surprises in the public warehousing market as players of all sizes chart steady progress. However, as consolidation continues and conventional practices are challenged, many of the Top 20 spots are up for grabs.

"There are several interesting factors impacting the 3PL area," Armstrong says. "Lower fuel prices are one thing, but another real challenge is what to do about Amazon. They do some out-and-out 3PL work, no doubt about it. There's a whole group of vendors contracted with them to use space to sell their product. The key distinction between distribution and 3PL is ownership of items, so Amazon is in the 3PL space."

Top 20 global public refrigerated warehousing companies, 2015

2015 Rank	2014 Rank	Organization	Country	2015 volume (millions of cubic meters)	2014 volume (millions of cubic meters)	% change
1	1	Americold Logistics[1]	Argentina, Australia, Canada, China, New Zealand, United States	28.10	26.90	4.5%
2	2	Lineage Logistics	United States	17.00	15.42	10.2%
3	3	Swire Group[2]	Australia, China, Sri Lanka, United States, Vietnam	9.46	8.62	9.7%
4	4	Preferred Freezer Services	China, United States, Vietnam	7.30	6.66	9.6%
5	5	Nichirei Logistics Group[3]	Japan, Netherlands, Poland	4.32	4.32	0%
6	6	Kloosterboer[4]	Canada, France, Netherlands, Poland, United States	3.52	3.52	0%
7	7	VersaCold Logistics Services	Canada	3.38	3.26	3.7%
8	8	Partner Logistics (ICSH B.V.)	Belgium, Netherlands, United Kingdom	2.86	2.86	0%
9	9	Interstate Warehousing	United States	2.34	2.56	-8.6%
10	n/a	AGRO Merchants Group[5]	Austria, Brazil, Chile, Ireland, Netherlands, Spain, United States	2.26	1.84	22.8%
11	13	Nordic Logistics and Warehousing	United States	1.98	1.76	12.5%
12	10	Cloverleaf Cold Storage Co.	United States	1.84	1.72	7%
13	11	Burris Logistics	United States	1.76	1.96	-10.2%
14	16	Frialsa Frigorificos S.A. De C.V.	Mexico	1.72	1.56	10.3%
14	12	MUK Logistik GmbH	Germany	1.72	1.50	14.7%
16	14	Gruppo Marconi Logistica Integrata	Italy	1.56	1.46	6.8%
17	17	Henningsen Cold Storage Co.	United States	1.52	1.44	5.6%
18	18	Congebec Logistics	Canada	1.41	1.41	0%
19	19	Bring Frigo	Denmark, Finland, France, Netherlands, Norway, Spain, Sweden	1.27	1.21	5%
20	20	Hanson Logistics	United States	1.12	1.12	0%

Source: IARW
[1] Americold Logistics includes China Merchants Americold, and Kangxin Logistics (Tianjin) Co., Ltd.
[2] Swire Group includes Guangdong Swire Cold Chain Logistics Co. Ltd., Finlay Cold Storage, Swire Cold Chain Logistics, Swire Cold Storage, Swire Cold Storage Vietnam, and United States Cold Storage.
[3] Nichirei Logistics Group includes HIWA Rotterdam Port Cold Stores, Frigo Logistics sp.z o.o. at Znin, Poland, Eurofrigo B. V.
[4] Kloosterboer includes Daalimpex and Varekamp Coldstores Holland.
[5] AGRO Merchants Group includes Castlecool Limited, Coldstore Urk & Wibaco, Comfrio Soluções Logísticas S/A, Dean's Services, Europe Total Logistics, Gestíon Frio Algeciras, Harthoorn Logistics, Icestar, LUCCA, Mullica Hill Cold Storage, Opticool B.V., and Wiener Kuehlhaus.

Amazon has probably $5 billion to $6 billion of business in this industry, and Armstrong says it is a persistent challenge to accurately classify their position. Much of it could be called 3PL warehousing, or private warehousing, and they play in the value-added space as well. Armstrong says it might be possible to pin down Amazon's figures for inclusion in the 2016 3PL report.

Armstrong's Top 60 list includes 3,540 facilities with 763 million square feet, with the average company managing 59 warehouses averaging 215,456 square feet. Armstrong's full 3PL listings reflect 9,000 U.S. commercial warehousing facilities with

1.9 billion square feet of space under management. As of this publication, Armstrong estimates the total U.S. warehousing market will be valued at $141 billion through 2015.

The Top 10

Exel retains its No. 1 spot on the list, although the gap has closed significantly following second-place Americold's 23% growth in reported space. Last year, the leader had three times the square footage of long-time second-place GENCO ATC, which fell to fourth after reporting a decrease of 500,000 square feet and 10 facilities. However, Armstrong emphasizes the figures do not reflect the success of GENCO's acquisition by FedEx.

"That combination is working out very well," Armstrong says. "FedEx is generating all kinds of opportunities for GENCO, which is taking advantage of those opportunities and bringing a skill set to FedEx they badly needed."

After two years in third place, Jacobson fell to No. 5 in 2012 before landing at No. 6 in 2013. In mid-2014, French logistics firm Norbert Dentressangle acquired Jacobson, and was in turn acquired by XPO Logistics in mid-2015. It now sits in third place, bumping Ryder, last year's third finisher, to fifth.

"Dentressangle and XPO? There's a challenge," Armstrong says. "France is not a vibrant, growing economy, Europe has been at about 1%, and there's no sign that it will heat up. Dentressangle has a presence there, a lot of warehouses, and Jacobson has real presence in value-added warehousing in the United States. However, if you look at both companies, I don't see much potential for them to have organic growth without a lot of cross-selling and help from other XPO entities."

CEVA, like 15 other members of the list, reported no difference in warehouse space and fell to sixth place. No. 7 through No. 13 remain unchanged. Next year, however, might reflect seventh-place OHL's acquisition by French shipping company Geodis. NFI and DSC each reported an additional million square feet of space, and so remain tied for No. 13. Armstrong noted the late 2014 news of Goldman-Sachs Group's acquisition of Neovia Logistics, and the late 2015 news that Denmark-based global 3PL DSV plans to acquire UTi.

Top 20 North American warehouses total square footage

Year	Millions of square feet	% change
2015	610.7	+3.3%
2014	591.2	+4.4%
2013	566.5	+3.6%
2012	547	+0.7%
2011	543	+5.6%
2010	514	-2.6%
2009	528	+4.6%
2008	504.8	

Source: Armstrong & Associates and *Modern Materials Handling*

The near future

The warehousing market estimates come from the CSCMP annual report, which increases the number every year. "That number, I suspect, is overly optimistic," Armstrong says. "We know we had a surge and buildup of inventory, and those are being cut back now. But we think those numbers, which are based on Census Bureau data, are probably still over-estimating, generally."

For instance, in the value-added space arena, Armstrong says about a third of companies didn't have revenue growth for 2014, and some actually lost money. In terms of square footage of inventory space, Armstrong says many looking for and expecting an inventory upswing haven't seen it yet. Thankfully, the overall U.S. economy is growing, as evidenced by renewed construction activity.

"That said, the economic climate at home is one that suggests the 3PL market will be pretty ho-hum in the fourth quarter and might continue that way in 2016," Armstrong says. "I'm not all that optimistic about the first half. We'll see some new construction, expansions and space, but it's not going to be hot and exciting."

Armstrong says he expects the market will continue to grow in 2016. It's not likely to grow 2.5% like it did in 2014, and although it might match the estimated 4.2% increase in 2015, he adds that 2016 will still probably see growth rates less than 5%.

Top 20 public refrigerated warehouses

This year's ranking of public refrigerated warehouses (PRW) reflects significant growth as well as increasing consolidation in the PRW industry.

The International Association of Refrigerated Warehouses (IARW) released its annual Global Top 25 List of the PRWs with the greatest warehouse capacity. The Global Top 20 currently operates 96 million cubic meters of refrigerated space—a 6% increase from 2014. The IARW also released a Top 25 list for North America, where PRWs posted 3% growth to 78.8 million cubic meters. The European Top 25 operate 16.57 million cubic meters.

For the first time, IARW also published a list of the Top 25 players in Latin America, in light of rapid growth in that region. Frialsa Frigorificos, which

placed 11th on last year's North America list, tops the Latin American ranking with more than twice the space of the second-place finisher. The list's companies manage a combined 6.6 million cubic meters of refrigerated warehousing.

In early 2015, Lineage Logistics acquired Columbia Colstor, which placed 15th on the 2014 global list and 10th on the North American list with 1.5 million cubic meters. Lineage's space under management is now 60% of the space of first-place Americold, and it is one of seven companies to post gains of 10% or more.

AGRO, the result of continued acquisitions of companies around the world, debuted in 10th place with 2.26 million cubic meters under management. U.S. Growers returned to the list, reporting the same 463,415 cubic meters as in its appearance on the 2013 Top 25.

According to the IARW, companies worldwide reported increased capacity and several new companies joined IARW in the past year. As a result, the combined space of IARW total membership—which represents 1,184 temperature-controlled facilities across 60 countries—is significantly higher. IARW members currently own or operate 133.96 million cubic meters—a 7.78% increase from May 2014 when the lists were last published.

"Our industry is continuing to grow to serve the needs of the food industry, particularly in countries outside North America and Europe," says IARW president and CEO Corey Rosenbusch. "Members are continuing to expand in developed markets, but are also focusing on emerging and developing markets where cold chain services are most needed." ☐

Editor's Note: Last year, the list included some significant year-over-year changes in square footage and the number of warehouses. These are often due to variations in the reports each company submits, but Armstrong says this year marks the second-consecutive year with an updated methodology in place. Reports sometimes include forwarding locations, transportation logistics, or 20,000-square-foot warehouses, which Armstrong & Associates work to identify and remove from consideration. Instead, they ensure the list focuses specifically on warehousing facilities of 100,000 square feet or more.

By **Josh Bond**,
Senior Editor

Voice-directed picking satisfies appetite for growth

Food bank uses cloud voice management suite to reduce picking shift length by 30%.

The Community FoodBank of New Jersey is a four-star rated charity serving 17 of New Jersey's 21 counties. From two facilities with a combined footprint of 315,000 square feet, the food bank distributed more than 44 million pounds of food in the past year, and demand is expected to rise this year. Less than three months after the organization deployed a voice management suite (VMS), it has already reduced the length of picking shifts by 30% for item selectors, allowing cross-trained staff members to spend more time tending to other tasks throughout the facilities.

Previously, the paper-based process was very time-consuming for the two facilities' 12 selectors. "From an information technology management standpoint, the system has proven to be efficient and has improved our picking time frame tremendously within our organization," says Monique Lewis, systems administrator for the food bank.

"We're excited about our early results, especially with respect to the positive impact the software has had on our staff," says Michael Jordan, director of operations. "Not only have we been able to reduce the time spent picking, but our team members have adapted to the software quickly and enthusiastically. Our top pickers are looking forward to using the new system during our upcoming busy season."

The cloud-based VMS (Voxware, voxware.com) allows the food bank to use voice-directed picking without the need to build supporting data warehouses or other technology infrastructure. The voice system is integrated into the food bank's enterprise resource planning (ERP) system and uses an additional wireless system in both locations to maintain the connection to the system. The food bank is now training additional selectors on the voice system. □

By **Josh Bond**,
Senior Editor

Fast-growing company avoids a sticky situation

Brewery uses automated hot melt technology to meet production demands.

Two Roads Brewery is one of the fastest-growing microbreweries in the Northeast. Since beginning operations in 2012, the brewery has increased production from 30,000 to 120,000 barrels per year. Amid rapid growth, the company identified problems with its aging glue equipment used to seal cardboard packaging. A new tank-free hot melt system has reduced downtime and helped achieve production goals.

Soon after they began operations, managers found production line growth hampered by frequent plugging of the tank-based hot melt delivery equipment they were using to glue boxes together. As Doug Concialdi, Two Roads' packaging manager, explains, the used equipment took nearly an hour to heat up and often produced char, which is by far the biggest problem in any hot melt application system. The system was also subject to human error. Operators frequently had to ask, "did someone turn on (or turn off) the glue machine?"

The company was also in the habit of keeping plenty of nozzles on hand and stopped the line three times a week to change one of the four nozzles. If a nozzle is plugged just once a week and takes 15 minutes to fix, the downtime is equivalent to an hour a month at a cost of $3,000 dollars an hour or $36,000 per year.

The installer agreed to demonstrate the equipment on site and replace it with the old system at no cost if Two Roads was not pleased. They practiced with the 10-minute startup time of the new glue machine (Graco, invisipac.com) and the process control technology that provides remote system analytics. They kept the first system and added another unit within less than a year. The system has reduced char and completely eliminated the need to replace nozzles while reducing material waste and the number of boxes that had to be repacked or resealed.

Concialdi says personnel no longer need to be assigned to check and maintain glue levels. He adds that the automated aspects of the new equipment protect the production line from human error. For example, if the unit does not dispense glue within an hour, it automatically shuts off. Before, there were instances where the unit could be running at high temperatures over the weekend. □

By **Josh Bond**,
Senior Editor

Fishery cuts waste while handling waste

Reusable bulk container enables sustainable public/private partnership

Every summer, thousands of anglers head to Algoma, Wis., on the shores of Lake Michigan to charter fishing boats then head home with the day's catch. The trouble for this harbor town is managing scraps that commercial fisheries call offal. After the Environmental Protection Agency (EPA) demanded the town improve waste handling practices, a new conveyor and bulk container system created a sustainable alternative to building a new treatment plant.

For the city workers tasked with handling the 120 tons of sewage waste generated annually, the fish scrap often clogged the sewage system and caused shutdowns that required manual cleaning and removal. It frequently overloaded the wastewater treatment plant, discharging untreated effluent into the lake. The EPA demanded that Algoma either build a new wastewater treatment plant or find some other solution.

Mayor Virginia Haske approached the Dramm Corp., which has a facility in Algoma where it turns fish scrap into an all-natural line of liquid fertilizers, and proposed that Dramm use the fish scraps generated locally for its fertilizer feedstock to divert the offal from the sewer system.

A new modern fish cleaning station at the marina allows fisherman to clean their catch and discard waste on a conveyor belt that deposits it into a bulk plastic container in a walk-in cooler. The plastic container (MODRoto, modroto.com) can hold upwards of 1,000 pounds. And, it doesn't require a pallet when a lift truck loads full containers stacked two-high onto outbound trucks.

At the plant, the containers are set on a lift table that dumps the fish scrap into an auger for processing. The waterproof containers are rinsed, nested and returned to the fish cleaning station. For the return trips, 130 empty containers fit in a single trailer.

"These containers are durable, they don't bow out and the covers fit so well that we can stack them two-high in transit without any spillage," says a Dramm representative. "Now we can get more than 30 in a trailer from our suppliers. With the container's high strength-to-weight ratio, we're transporting more fish scrap per truckload by weight."

After nearly eight years in operation, the system has diverted approximately 500 tons of fish scrap from the sewage system, rendered a new plant unnecessary and helped protect Lake Michigan from further contamination.

"Our suppliers treat the containers rougher than we'd like, but these containers have held up well over years of use," Dramm says. "Their life expectancy is far longer than any container we've ever used." □

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MODERN MATERIALS HANDLING

The evolving parcel handling industry

Distribution centers are handling more parcels than ever, and that's only likely to increase. Here's how materials handling professionals can meet the challenge.

By Chris Lewis,
Contributing Editor

IT'S DECEMBER. Look out your front door, and you'll probably see a steady stream of UPS, FedEx and USPS trucks traveling up and down your street, dropping off one parcel package after another. In some urban neighborhoods, all three may deliver to the same address during the course of a day. And with online sales projected to rise by double digits, no let-up is in sight.

To handle all of those parcel packages, distribution centers and parcel handlers have had to evolve their materials handling and information technology systems in a hurry—and on a variety of levels. Indeed, no factor in recent memory has fundamentally impacted the industry more than e-commerce, as it has influenced nearly every facet of the supply chain and increased the connectivity between B2B and B2C suppliers and customers.

As a result, the industry has had to focus on efficiency, as volumes and transactions are increasing at an exponential pace. To keep costs down, order fulfillment operations and parcel handling sortation centers alike must pay attention to every detail.

The phenomenon isn't limited just to the B2B side of the business. B2C e-commerce is requiring suppliers and industrial distributors to offer the same types of services to their business customers that consumers experience at home. That has led to the development of new ways to process orders, deliver packages and meet the customer service level requirements, all while overcoming the challenges initiated by the evolution.

"This is such an interesting time for the materials handling industry," says Chris Assenmacher, CEO of Carter Control Systems. "As technological developments converge with the demand for materials handling, a dynamic atmosphere for innovation has been created."

With this atmosphere for innovation in mind, two challenges stand out in particular. First, the change to dimensional pricing had led materials handlers to use poly bags more often than corrugated and cardboard cartons; a trend that creates handling issues that were previously not considered, especially for conveyor and sortation systems. Further, the increase in "each" picking has driven the need for more automation and, consequently, more versatile and compact materials handling systems that must also provide real-time data. To overcome these challenges, here's a look at some of the evolving solutions that are currently being implemented.

Camera-based imaging offers users a variety of process optimization benefits.

Dimensional data is now a factor

Until this year, the cost of shipping a parcel package was based on its weight rather than its cube: As a rule, dimensional rating only applied to air shipments. However, now that carriers realize there has to be a better way to use the space in the back of their trucks, the cubic dimensions are more important than the weight of a package, especially when it comes to calculating the cost of ground shipments.

"Formerly, parcel shippers paid a cost representative of an item's weight," says Tim Kraus, manager of product management at Intelligrated. "Today, they must pay for the space an item occupies on a delivery truck to be more in line with the size of an item."

That, in turn, has resulted in a renewed focus on the size of the package used for parcel shipments. "The newer requirements mean that the actual dimensions and weights of shipments have become vastly important," says Sean Robinson, sales and marketing manager at QMI Services, a division of CubiScan. "Operations can now benefit from technology that accurately and efficiently captures the data of packages, even if they are irregularly shaped like poly bags and bubble mailers."

Cubing systems also capture the length, width and height of products during the receiving process as well as characteristics before shipping.

"Operations can now benefit from technology that accurately and efficiently captures the data of packages, even if they are irregularly shaped like poly bags and bubble mailers."

—Sean Robinson, QMI Services

After scanning items, there are a number of ways to capture data and ensure packaging sizes are accurate and, if necessary, are reduced prior to shipping, thereby lowering costs and increasing bottom lines:

• **High-speed checkweighers.** In addition to recording actual shipping weight, checkweighers compare the expected weight of a package (during inbound scans) to the actual weight of a package. "The bar code and weight data is merged and transmitted on to either the shipping software or host, providing shippers an opportunity to validate their order picking and reduce the likelihood of inaccuracies," Robinson says.

If the weight is determined to be higher or lower than anticipated, a checkweigher may send a signal to a reject device that removes the package from the line. "This signal can either be programmed directly into the checkweigher, especially if the same type of product has been produced in batches typical for packaging operations, or used to dynamically identify each item in real time, per order, as a means of pick verification during distribution," he explains.

• **In-motion cubing systems.** Cubing is often used in conjunction with checkweighers. Aside from capturing weight, cubing systems also capture the length, width and height of products during the receiving process, and the characteristics of packages before shipping. According to Robinson, these systems are installed as part of an integrated checkweigher/cubing system or stand alone near the location in which the items are being scanned on the conveyor.

• **Automated label applications.** Once items are scanned, weighed and cubed, shipping label data can be merged and used to print labels that are applied to boxes. In most cases, printer-applicators are used to apply the label to the side or the top of a parcel. However, many compliance or custom applications now require multiple labels, folded top or side applications, or additional printing of packing lists, each of which are available with automated label applications.

• **Verification scans.** After labels are printed and applied, verification scans ensure the labels are not only legible, but that the correct labels were also applied to the proper packages—a task that is completed by scanning the package ID bar code, along with the shipping label that was just applied.

Solutions for constantly evolving challenges

To keep up with new fulfillment and shipping requirements, the software that manages parcel handling operations must analyze the continuous variations in packaging sizes and materials, provide real-time data about the status of orders and

Roller conveyors can be converted to belt conveyors or belted motor driven roller zones to improve product flow.

interface with enterprise-level systems.

However, the increase in demand for fast, accurate delivery has led to another necessity: highly automated, transparent equipment that maintains order statuses and delivers data quickly and efficiently.

• **Bar code readers.** To ease the installation process, some of the latest six-sided bar code readers now incorporate imagers and sensors into three pre-assembled parts. These can be calibrated and integrated into traditional materials handling systems in less than one hour. "The readers also feature controllers with multiple belts and height sensors to ensure product gapping and speed control, resulting in seamless product induction to belt or tray materials handling systems," says Jonathan Stiles, marketing manager at Datalogic Automation. "And, they are pre-configured and pre-assembled at factories at a fraction of the cost of previous readers."

• **Conveyors.** At times, poly bags, padded envelopes and other irregularly shaped materials are not detected properly on conveyors, due to their unusual dimensions. To improve their detection capabilities, along with transportation on conveying surfaces, many facilities are replacing conveyor rollers with conventional 3- or 4-inch centers with rollers that feature 2-inch centers. In addition, the roller conveyors can be converted to belt conveyors or belted motor driven roller zones. "These upgrades provide a more consistent conveying surface, which improves product flow and decreases the risk of jams, improper orientation and side-by-side items," Intelligrated's Kraus explains.

• **Integrating drive systems.** Filling a parcel order may require bringing together items picked from a variety of picking zones at one time in a pack station and then sorting them to the right shipping lane. An integrated system of drives and controls provides materials handlers with a customized solution to implement and maintain all of the drive train components necessary to synchronize that process.

"An integrated drive system can be seamlessly integrated in any drive train and in any type of automation environment," says John Meyer, manager, marketing communications at Siemens. "And, in doing so, materials handlers can reduce their maintenance costs and engineering time by upwards of 15% and 30%, respectively."

• **Robotics.** Traditionally, robots have been used to handle palletizing and de-palletizing functions. As sensor and vision technologies have improved, new robots are emerging that can be adapted for picking and packing operations as well, says Assenmacher from Carter Control. "Since we are being asked to create a large number of box sizes during the course of a day than we ever have before, we had to find a solution," he explains. As an example, he adds, end users are exploring the use of robots to handle the requirements of box-forming operations.

The next evolution may be the deployment of mobile robotic picking solutions that flexible end-of-arm tooling that can pick a variety of products in different types of order picking scenarios, thereby eliminating the need for human involvement. "We see a lot of potential in collaborative robots as well, which allows the robot to work side-by-side with humans, without isolating it for safety reasons," Assenmacher adds. "As the technology matures, we expect these robots to eventually be used in many types of materials handling applications."

"An integrated drive system can be seamlessly integrated in any drive train and in any type of automation environment."

—John Meyer, Siemens

Prepare for the future of data collection

The technology that is used to collect data and track goods from initial development to final delivery is constantly evolving as well. To stay ahead of the curve, some facilities are exploring the following technologies:

• **3D technology—for robots.** "3D technology allows us to fully understand the dimensions of the products we are handling," Assenmacher says. "In the past, we had to hard code the box

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dimensions into our systems and identify which boxes were being delivered to the robot. Now, we can dynamically process those dimensions and adjust proactively to handle the box."

To further increase the capabilities of robots, the 3D technology can also be used for mixed case palletizing and de-palletizing, as well as other picking applications. "While still in its early stages, as far as materials handling systems are concerned, I believe 3D vision and sensor technology will considerably alter how—and where—robots will be used in materials handling applications," Assenmacher adds.

An integrated system of drives and controls provides parcel operations with customized solutions to implement and maintain all of the drive train components.

• **Camera-based imaging.** Camera-based imaging offers users a variety of process optimization benefits. It is particularly ideal for bar codes that are wrapped around corners, such as poly bags, damaged bar codes or irregularly shaped objects. "Not only can saved images be used for OCR and video coding applications, but they can also be catalogued for offline, process optimization analysis. Additionally, bar code quality measurements allow users to predict process issues before they become costly," says Datalogic's Stiles.

• **RFID.** Unlike bar codes, which only allow facilities to identify products at certain stages of the logistics process, radio-frequency identification (RFID) provides a more comprehensive method for the tracking of goods and products throughout their entire lifecycles. "It really makes the logistics process more efficient, as materials handlers can

see where products are at all times and ensure their safety. I anticipate a widespread adoption over the next several years," says Assenmacher.

As B2B and B2C e-commerce continues to expand, there is no sign that the evolution of the parcel handling industry will be deterred anytime soon. And, consequently, the demand for materials handling solutions—that capture dimensional data, substantially reduce miscalculations and improve efficiency—will likely only increase.

By actively responding to this demand, materials handling professionals can ensure their products and services are constantly evolving as well, so their customers are better equipped to overcome the challenges of the parcel handling evolution on a long-term basis. ☐

Companies mentioned in this article

- Carter Control Systems
- Datalogic
- Intelligrated
- QMI Services, a division of CubiScan
- Siemens

Automate conventional warehousing with pallet storage system

A new version of the RapidStore UL1400 storage and retrieval system that automates conventional pallet storage has been released, incorporating performance optimizing software and supporting freezer/cooler applications. Engineered to retrofit into existing manual warehouses with low to medium building heights, the system accommodates facilities normally serviced by manual materials handling equipment—such as very narrow-aisle (VNA), operator-up, swing-reach fork trucks. Equipped with a corresponding rack structure, the storage/retrieval machine rides on a floor rail and is stabilized overhead with a steel guide tube. Features include a rotating fork load-handling device, low first shelf height of 8 inches to maximize warehouse space, and software that manages the activity, inventory and material flow. **Dematic, 877-725-7500, www.dematic.us**.

Access cartons, totes and cases with goods-to-person shuttle system

Efficient and scalable, the OLS automated storage and retrieval shuttle system provides quick access to cartons, totes and cases in a compact footprint. Ideal for high-volume distribution operations with short order cycle times, the system can store and retrieve a variety of product types and carton sizes—from single-deep to quadruple-deep storage—using a range of interchangeable load handlers. It operates in ambient and chilled environments, increasing storage density and helping optimize goods-to-operator order fulfillment, just-in-time inventory management, and product sequencing and buffering. The system scales as transactional volume grows or storage demands change, with shuttles fixed on a single level or roaming between multiple storage levels. **Intelligrated, 866-936-7300, www.intelligrated.com**.

VLM ideal for storage, picking of manufacturing parts

Providing automated goods-to-person fulfillment, the Logimat vertical lift module is ideal for manufacturers looking to improve picking speeds and accuracy, while reducing labor costs and consolidating floor space. The VLM features a rack-and-pinion drive system for elevator and extractor movement; a smart placement algorithm for optimized tray positioning and batch order picking; a laser pointer system with centrally located touchscreen to identify the location of the required part stored within a tray; and electrically driven locking door to secure high-value items. Because the opening height of the machine adjusts to the worker, the system ensures proper ergonomics, while a tilt mechanism reduces reach depth for easier removal of goods. Trays can hold loads up to 1,650 pounds. **SSI Schaefer Systems International, 704-944-4500, www.ssi-schaefer.us**.

Add robotic, 7-axis picking to goods-to-person systems

Allowing humans and robots to work together, side-by-side, the AIP automated item pick solution deploys a KUKA

FlexFellow robot to support picking operations. The robot picks up to 60% of stored products delivered by a goods-to-person automated system, and the operator completes the order. Easily moved between workstations, the robot features integrated joint torque sensors in all seven axes for maximum sensitivity, 2D object recognition of one or more items within a replenishment bin, and a rotating gripper with three independent suction units capable of picking items weighing up to 13 pounds. **Swisslog, 877-353-9455, www.swisslog.com/na**.

High-density pallet shuttle system for deep-lane storage optimizes space

The pallet shuttle high-density, semi-automated pallet storage and retrieval system makes loading and unloading goods easier. Ideal for deep-lane storage, the system allows storage of different reference numbers per pallet shuttle—creating a higher number of stored references. It also optimizes space by compacting pallets with different widths inside the lanes and by minimizing the height between levels. Ideal for high-density, compact storage, it can also be deployed in cold storage applications. **Interlake Mecalux, 877-216-0612, www.interlakemecalux.com**.

Easily handle heavy loads in VLM

A new vertical lift module accommodates items weighing up to 2,205 pounds per tray. The Shuttle XP 1000 allows the simple and ergonomic storage of heavy tools and large goods, as well as a large number of small parts per tray. Trays widths range from 4.1 to 13 feet and slide out on casters instead of conventional plastic sliding shoes. The storage system can be used as a production buffer, to supply assembly lines, as a tool store or to distribute spare parts. It also operates as either a stand-alone solution or in combination with other machinery. **Kardex Remstar, 800-639-5805, www.kardexremstar.com**.

High-speed mini-load AS/RS provides high storage capacity

The FX-Quad automated storage and retrieval system offers fast mini-load cranes for flexible, high-performance handling of various item sizes and types. The system can handle one to four loads, and its twin-fork, double-deep feature provides both high storage capacity and high throughput operations. With a maximum load capacity of 660 pounds, the mini-load system can be combined with a pallet AS/RS to provide residual case management with high-density storage. It is ideal for use in high throughput environments such as warehouse, distribution and manufacturing. **Muratec, 704-972-4475, www.muratec-usa.com**.

Three different AS/RS for freezer warehouses

Engineered for the severe environments found in freezer warehouses, three different automated storage and retrieval systems are offered. First, the PTS shuttle-based system addresses the growing demand for goods-to-person order fulfillment at case, and less-than-case quantities in frozen DCs. Also offered is the Magmatic AS/RS, equipped with load-handling devices for pallets that accommodates up to 2,000 different stock keeping units. The system maximizes overhead space to provide organized, compact automated storage that ensures 98% accuracy of orders filled. Finally, for buffering, sorting and staging palletized unit loads in exact loading sequence, the ACTIV dynamic storage technology for freezer storage works in existing or low overhead clearance buildings handling up to 1,000 SKUs. **Retrotech, 866-915-2777, www.retrotech.com**.

Horizontal carousel provides lifetime efficiency

Using a lifetime efficiency system, the supplier's horizontal carousels constantly provide maximum benefits, including reducing labor by 67% and increasing throughput by up to 600% from installation and through decades of use. The program incorporates carousel equipment, controls and software that maximize efficiency in SKU and item placement. Its advanced algorithms continuously determine which items belong in the carousel system, in what location(s) and quantity, matching business and throughput changes automatically to ensure peak performance. **SI Systems, 610-559-4043, www.sihs.com**.

Flexible, scalable shuttle system

The Stingray shuttle-based automated storage system for picking, consolidation and buffer warehouses—as well as in stocking and distribution facilities—is flexible and scalable. It can store totes, trays and cartons or other storage and transportable goods of various sizes in single-, double- or multi-deep configurations. The system features a variable load-handling device for direct interface with items without the use of trays or totes. Depending on the style of shuttle deployed, it can store goods measuring from 6 x 8 inches to 35 x 31 inches and weighing up to 110 pounds. Other highlights include all-wheel drive on each shuttle for consistent performance and reliability (even with varying loads and in deep-freeze conditions), bipolar BUS-bar communication and power supply, and brake energy recovery. **TGW Logistics Group, 231-789-4547, www.tgw-group.com**.

Shuttle and rack system optimizes storage space, easily expands

Scalable and flexible, the Adapto storage, retrieval and transportation system makes optimal use of storage space in warehouses. It includes a racking structure with integrated shuttle track system; multi-directional microshuttles that transport product carriers between rack locations and exits/entries; lifts that allow the shuttles to move between rack levels and

exits/entries; shuttle traffic control software that maximizes system throughput and minimizes order lead times; and user-friendly interface that provides a real-time overview of the system. The system can be extended with additional aisles to increase storage capacity while still in operation. For higher throughput, more microshuttles and lifts can also be added to the system. Integrated maintenance platforms allow quick operator access to all shuttles and rack locations for fast and safe trouble-shooting. **Vanderlande, 770-250-2800, www.vanderlande.com**.

Modular, low maintenance unit load AS/RS creates flexibility

Configurable in heights up to 148 feet, the viapal unit load automated storage and retrieval system handles pallets and products up to 6,614 pounds. For flexibility, multiple load-handling device options may be specified, allowing the system to handle different products on bases other than a pallet. Features include a dynamic drive, with an optimized driving curve, that enables speeds up to 787 feet per minute. Low-maintenance components that minimize downtime and maintenance costs. Applications range from sorting, production and assembly, to manufacturing, shipping and spare-parts storage. **viastore systems, 616-977-3950, us.viastore.com**.

High-payload VLM stores heavy items in a small footprint

Developed as a flexible, cost-effective way to store heavy items in a small footprint, the OneTon vertical lift module saves up to 90% of floor space, increases productivity and picking accuracy, and creates a more sustainable operation. Ideal for heavy items, such as tooling and dies, the machine holds items in metal trays that are automatically stored and retrieved as needed. Tray heights are adjustable on 1-inch increments, allowing storage of varying product heights. To maximize the available overhead space, overall unit heights come in 3.94-inch height increments. Each tray has a standard net load capacity of 2,200 pounds and offers a choice of solid or slotted perimeter walls for partitions and dividers. **Modula, 207-440-5100, www.modula.us.**

Store, retrieve tires with push of a button

Fully motorized, a new tire handling automated storage carousel offers quick, easy storage and retrieval of various tire sizes up to 44 inches in diameter to maximize storage efficiency by fully using a facility's vertical storage space. With the push of one button, the carousel allows one operator to rotate carrier frames, locate desired tire sets, stop at the proper position, and remove tires safely at floor level. The automated lifting

function reduces the risk of injury. Units may be specified in pre-configured sizes, or custom manufactured to exact specifications. **Stanley Vidmar, 800-523-9462, www.stanleyvidmar.com.**

VLM configurable with multiple columns for maximum storage density

Capable of being configured with two to seven storage columns, the SILO² multi-column vertical lift module is ideal for picking small- to medium-sized items with high specific weights including boxes, steel molds, nuts and bolts, electrical and mechanical components, pharmaceuticals and spare parts. Systems can measure up to 49.21 feet high and 23.24 feet wide in more than one billion possible standard configurations. The combination of different tray dimensions (widths from 27.56 to 78.74 inches, depths from 23.62 to 51.19 inches, and heights from 1.61 to 15.75 inches) and a range of accessories for internal division (side extensions and removable dividers) accommodates a range of items. For the integrated inventory management and control, the machine is equipped with an interactive multimedia workstation for intuitive, accurate picking and replenishment. **ICAM, +39 08 04 91 1377, www.silo-icam.com.**

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Rosemary Coates

TITLE: Executive director of the Reshoring Institute at the University of San Diego and president of Blue Silk Consulting

LOCATION: San Diego and San Francisco

EXPERIENCE: 25 years experience in supply chain management and systems consulting

PRIMARY FOCUS: Global and domestic supply chain management, including experience in outsourcing and reshoring domestic production.

***Modern:* At the Supply Chain Outlook Summit, you talked about your roles as a consultant, advising clients on their outsourcing strategies and also as the executive director of the Reshoring Institute, advising companies on how to bring some of that manufacturing back to North America and the United States. In a sense, you've seen them going and coming. How do you describe what is going on in the market today?**
Coates: We reached a steady state where, for the first time in years, we're bringing back as much manufacturing as we're outsourcing. According to a recent study from Boston Consulting, 54% of U.S. manufacturers with more than $1 billion in revenue are considering reshoring some or all of their manufacturing. The fact that more than half of the companies are bringing manufacturing processes back onshore will have a significant effect on global procurement, logistics, trade and manufacturing strategies.

***Modern:* Why are more companies rethinking their global manufacturing outsourcing strategies?**
Coates: Initially, companies outsourced for a number of reasons. Some wanted to save money on the cost of labor, others wanted a more low-cost environment to work in, while others did it just to follow what everyone else was doing at the time. Fast forward to 2015, and it's clear now that many of those firms made this move without thinking through the total cost concept. They made simple decisions—based mainly on low labor cost—without thinking through all of the issues.

***Modern:* Why is this trend taking place?**
Coates: As labor rates rise around the world, and as more quality control issues surface, companies are rethinking why they outsourced overseas in the first place. Now, they're looking at what they should bring back. And from what we're seeing, that's primarily advanced manufacturing. This will shift the supply chain significantly as companies that are bringing in goods from Asia, India and South America now look to re-establish manufacturing, sourcing, and distribution networks here in the United States.

***Modern:* How will reshoring impact supply chains?**
Coates: Despite the appetite and support for reshoring, the process is not as easy as you may think. It requires strategy, planning and a commitment to invest in rebalancing your global supply chain. We're all living in a world where companies like Amazon literally ship overnight, and companies are going to have to figure out how to match that speed for industrial products, too. To get there, they'll have to do a significant amount of re-engineering to their global supply chains.

***Modern:* So, is reshoring the answer to what ails manufacturing?**
Coates: Well, we're not going to go back to what manufacturing looked like in the 1960s. But, we're taking steps in the right direction. And, in a sense, we don't want to bring back 23-cent-an-hour T-shirt production. We should aim for advanced manufacturing jobs that pay between $45,000 and $85,000 a job. They are the crossover between manufacturing and engineering.

***Modern:* Reshoring has been a big part of the political dialogue. Why do you think it's important now?**
Coates: Because we've gotten to the point where it's time to rethink the process, make products in the markets where they are sold, and help rebuild the American economy. It's important for our future and our children's future.

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