

EL MILAGRO:
*Micro Chips,
Then Macro Chips*

DESERT DEPOT:
3PL to Yuma

SANMAR:
*The Clothes Make
the Plan*

ALIMERKA:
*Bringing It All
Back Home*

AMAGOSA:
*Thriving in the
Desert*

MICROLAN:
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of the Box*



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Marching Through the Distortions

Companies parish or profit based on what they can do for their clients. We understand that our customers are as loyal to us as we give them reason to be. In this sophisticated client-manufacturer partnership, growth must be a two-way proposition or the deal will inevitably sever. There can be no mixed sentiments, no false promises.

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This is the flag the Mecalux Group is waving into the new year as we continue marching through uncharted global economic crisis, stunning shifts in the industry's technological capabilities, increased competition in the world's few blossoming economies, and the specter of change threatening to bury companies resistant to change. The success of this march is entirely predicated on customer satisfaction. If the Mecalux Group can grow our clients businesses, add value to their operations, optimize their process flows and satisfy them with our execution, the minimizing effect those affairs have on business growth will prove toothless.

In this issue, we will show you our total dedication to bringing our clients (and indeed, some of your clients) closer to their end goal and, by proxy, our goals as well. We'll show you best practices in which we not only bring our clients the best ware-

housing solutions, but also showcase instances in which we go to abstract lengths to do so. You'll read about new technologies that are just starting to infiltrate your business, shape your efficiencies and change your capabilities forever. You'll also read about technologies that won't have such an effect for another decade. Read up, then prepare accordingly. It isn't complicated; that's the profoundness of it. It's all remarkably simple. From partially automating your storage space to properly slotting it, we'll take you through economical ways to improve slowly if it's more appropriate than a fully fortified storage space.

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Javier A. Carrillo
President
Interlake Mecalux

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In order to make you smile,
Novo Mundo always goes farther



WE WANT
TO SEE
YOU SMILE



Novo Mundo's history began 55 years ago in a store barely 861 square feet. Now, there are over 160 stores and more than five thousand employees making more than five million clients smile across north and central Brazil. Nevertheless, Novo Mundo's network does not stop there. In the next months, you will see more people, from more places, smiling with Novo Mundo.

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Micro Chips, Then Macro Chips



Family-owned tortilla company, El Milagro, attempts a used system retrofitting only to discover they were on the wrong side of the racks.

By Adam Shafer

More than 65 years ago, Raul Lopez Sr., a Mexico City native with childhood dreams of being a bullfighter, moved north to the U.S. during the Second World War. The economic situation of the young orphan who had lived with his uncle since he was 11, compelled him to take a job offered by a U.S. recruiter to work for the Il-

linois Central Railroad. "El Torero," as many would later come to call Lopez, spent his mornings inspecting and installing railroad tracks throughout the Chicagoland area and his nights applying the first trade he learned through his flour mill owner uncle: making flavorful tortillas. Soon, Lopez's days were jammed not only



[Top] The exterior of El Milagro's production facility, which also has a small store attached in which customers may directly purchase pre-packaged products (right).



“El Milagro bought a system that they had to fit into their operations, Now they have the ability to create something brand new.”

~Jeff Ross, ESS

with rail work, but also with selling his tortillas to his fellow trackmen. By 1950, Lopez ditched the rail work to open a restaurant in a Chicago neighborhood central to the railroad personnel. He called it El Milagro, or “the Miracle.” And while Lopez perhaps viewed his business’ existence as miraculous, its continued success today certainly isn’t.

After slow conservative growth in Chicago, Lopez’s family, led by his

son Jesse, daughter Paz and five other children and a smattering of grandkids, expanded El Milagro into Texas in 1997, about the same time Lopez Sr. passed away. “Expanding to Texas is something our dad considered,” said Paz Ramirez, Lopez Sr.’s daughter and GM of the company’s Texas division. “He wanted to retire in a warmer atmosphere.” The opportunity to expand to Texas came when local tortilleria, El Lago, offered up its business for sale.

Early in the process, adjustments to the racking height were necessary, as there were low-hanging ceiling pipes that were not originally accounted for.



TECHNICAL DETAILS

| | |
|---------------------------------|-----------|
| Upright Height: | 18 ft. |
| Flow rail lines: | 50 |
| Total pallet storage capacity: | 1,188 lb. |
| Top level pallet capacity: | 700 lb. |
| Bottom 2 level pallet capacity: | 2,200 lb. |
| Total bays: | 25 |
| Pallet depth: | 6-10 |

The plant, located in Austin, was used primarily to manufacture tortillas, more or less picking up right where El Lago had left off. It didn't take long for El Milagro to find success in Austin and in 2009, the business branched out further, purchasing a modest manufacturing plant in the nearby city of San Marcos. The facility was renovated and fortified with a corn silo allowing El Milagro to produce pre-cut corn tortilla chips, flour tortillas and other similar products. The result was a sudden influx of new business and, of course, new challenges.

Fixing the Mix 'n' Match

Knowing that the new facility in San Marcos would be storing, not only finished products, but also raw materials – and lots of it – Jesse and Lopez Sr.'s grandson Hector hoped

to retrofit the facility with a used pallet flow rack that fit the company's GMA Grocery Manufacturers of America pallet specifications. Using the contacts El Milagro had spent years building in Chicago, Jesse and Hector Lopez found and purchased an inexpensive, pre-owned pallet flow system he believed would fit in their San Marcos facility. Soon after the racking materials were shipped to Texas and installed, El Milagro turned to local distributor ESS. It was immediately apparent that the system wasn't going to be smoothly operating

within the plant, but El Milagro was hesitant to spend additional money for a new system to replace the pre-owned system it had just purchased.

Jeff Ross, president of ESS Group, got involved in the El Milagro installation two years ago. He said that by the time he visited the site to evaluate the efficiency of the used pallet flow, the booming tortilla company had already realized adjustments were necessary. "It was a grab-bag kind of a deal," Hector Ramirez, one of the company's managers, reflects today. "It was a mish-mash system that didn't match up correctly." "They had no flow lanes and only two flow rails, neither of which had brakes," Ross says. "A pallet flow system has to be in a straight line, but if you looked down this one, it looked as if it were inclining up a hill and then back down."

Adding to these issues were some missing rollers and a few makeshift beam connectors. ESS wasn't fully convinced the rack sitting in the San Marcos warehouse was usable, much less salvageable. Finally, El Milagro's staff found something they weren't completely adept at doing. "ESS was brought in only after there was a problem," Ross said. "My first action, really, was education; to show them how a proper pallet flow system should function."

“There were things that we were able to optimize that we couldn't have with the existing system.”

~Hector Ramirez, El Milagro

Ebbing Tide

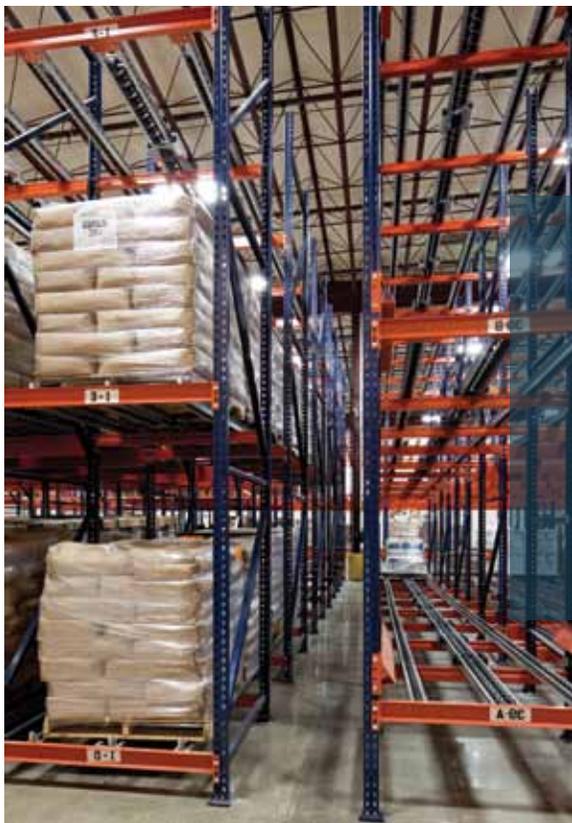
El Milagro's most pressing problem at the outset was the lack of brakes on much of the pallet flow system. With nearly 200 pallets of chips circulating each day, it is vital to have a solid braking system so the high volume of pallets don't go careening off the rack. Immediately, ESS identified the importance of determining the flow rail's efficiency, so the distributor brought in flow rail manufacturer Mallard to determine if El Milagro's necessary pallet specifications would work with the system installed in the space.

ESS and Mallard ordered a sample flow lane, but were unable to get it operating. Even if they'd gotten one flow lane functioning, there was still the issue of knowing if the system was even engineered to hold the loads of what they were going to be storing. "All the components for the rack were a potpourri of things," Ross said. "It

would have taken a dismantling it and then piece-by-piece reconstruction." For El Milagro to have replaced the dysfunctional flow rails with new ones would have cost them about 70 percent of what it would cost to replace the whole system. "If you want to do it," Ross advised the tortilla manufacturer, "do it right and make sure it's an engineered system." The message, essentially, was that everything about El Milagro's car needed replacing except its steering wheel. It was a sentiment El Milagro had feared, but fought against fervently. "We were shopping around to see if there was anything salvageable about the system," Paz Ramirez lamented, "because it was going to be a complete loss if there wasn't. El Milagro agreed that the best thing to do was reset and install new rack components engineered to hold the load. "Eventually we had to bite the bullet and get something new," Ramirez said.

Molding Clay

ESS, working closely with both Mallard conveyors and El Milagro, revised the design concept a half-dozen times during the summer of 2010. Generally, every specification was taken into account, leaving the only blip a small oversight on the clearance height of the facility's ceiling. Quickly altering the area needed for clearance in addition to taking into account the manufacturer's combination storage of both raw and finished materials, ESS designed an efficient plan and called on the Interlake Mecalux pallet flow system to replace the unstable, hodgepodge initially installed. "The Mecalux rack appealed to us – the wheels especially," Hector Ramirez explains, "because they were guaranteed to work. We were in a position [with the used system] where we were getting red flags every step of the way. When we heard the rack was guaranteed to work, we were



If you want to do it, do it right and make sure it's an engineered system.

~Jeff Ross, ESS

CORN SUBSTITUTE

To simulate the weight El Milagro's newest products would heap onto the pallet flow system, they gathered over three dozen 2,000 lb. oil containers on the lower racks. The idea is to keep the oil situated on the rack for

a period of weeks to ensure the system can withstand the demands of the product without risking a malfunction. At the time of publication, the system was flowing properly and everything remains on schedule.



TAUGHT, THEN BOUGHT

Texas distributor ESS proves that most of the work necessary for a turnkey solutions provider must be done before the materials are even ordered.

ESS Group's quick study and control of situations similar to the one presented in the El Milagro case study is neither new nor unusual. For the last decade, the material handling and storage supplier, servicing much of the state of Texas, has made it a point not only to install warehousing solutions into their client spaces, but to also make sure they are getting the biggest ROI possible.

Located 70 miles northwest of Houston in Brenham, Texas, the ESS Group specializes not just in servicing installations, but in designing solutions around the end desires of each customer. More than half of ESS' client work happens before a single storage system is delivered. Sometimes, these services manifest simply as maximizing a client's space, or articulating why a customer's current process flow isn't working (as was the case with El Milagro). In other instances, ESS will educate clients on how the systems operate and how to achieve maximized efficiency.

In addition to installation and repair services, ESS has earned a reputation in East Texas as having one of the best and most comprehensive product lines on the market, including the full roster of Interlake Mecalux storage solutions. Ultimately however, it is ESS' technical services that provide it with an extra advantage.

Company president Jeff Ross views the job for which ESS is best suited as not only a solutions provider, but as an education source, striving to work with employees and clients alike in order to "ensure the concepts are understood and followed" throughout every project.

good." Even now, months after the seven-foot-high pallet flow systems have been put in place, El Milagro remains cautious. Leading right up to the new year, the tortilla manufacturer was heavily testing its rack by loading it up with 2,000-lb. drums of oil representing the weight being placed on each pallet. In 2012, El Milagro plans to begin production on a new product, (not yet announced at the time of this printing) and wanted to ensure beyond a doubt that the pallet flow racking can withstand the weight and frequency of use. "We're not just hoping it's going to work," Paz Ramirez said, "it's definitely going to work."

The depth of flow lanes, aisle width, load and unload placement and direction of flow were all priorities when designing the new system. El Milagro's main concern was the sheer volume of product necessary for storage. The installation began in June 2011 and completed two weeks later. "It actually works," Hector Ramirez says today with a laugh. "We put on a pallet and it flows just how we want it – all the way to the end. It's easy to get out, easy to get in. It works perfectly." "El Milagro bought a system that they had to fit into their operations," Ross says today. "Now they have the ability to create something brand new. They've got a piece of clay and they're molding it in the shape they want." ESS chose Mecalux pallet flow for the same reason it pushed El Milagro to ditch the retrofitting and install a new system: both would allow the customer the most highly efficient, flexible system, something the distributor felt just couldn't be accomplished with any other solution. 

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The Clothes Make the Plan

How the new construction of a distribution center in Dallas, Texas, for garment provider SanMar, relied on old friends.

By Adam Shafer

It is noon in Texas, and many warehouse employees throughout the state are preparing for lunch. For SanMar, however, the day is just beginning. The wholesale garment distributor, based out of Seattle, recently expanded eastward into a newly constructed Dallas distribu-

tion center. However, at SanMar, the company's regional distribution centers do not dictate operating hours: the home office does. So while most of Texas awaits 11:30 shifting into noon, it is functionally only half-past nine in SanMar's 700,000-square foot facility.

Ultimately, the company values efficiency and punctuality over all other qualities of a successful business, which is exactly why the company's busiest time is later in the afternoon when the day's orders are in and the personnel stays as late as necessary to see that each shipment makes it out the door. Scott Larsen, president

of RH Brown, the rack distributor and installer who collaborated with SanMar on the Dallas project, views SanMar's national synchronization as a boon to customer service. "It's awesome," Larsen says. "Whenever a company does something a little off the norm and they make it work successfully, it's worth noting."

Also worth noting is the wholesale distributor's pattern of growth, which not only expanded outside the Washington area into Texas, but has veined into Florida as well. Nourishing that growth is the increasing footprint of clubs and corporations demanding high-volume garments such as embroidered t-



Nourishing that growth is the increasing footprint of clubs and corporations demanding high-volume garments such as embroidered t-shirts and polo shirts designed for large groups.

TECHNICAL DETAILS

| | |
|-------------------------------|---|
| Previous facility size: | 300,000 sq. ft. |
| New facility size: | 700,000 sq. ft. |
| Type of rack installed: | High-capacity, high-height Selective pallet rack |
| Upright height: | 38 ft. |
| Truckloads of rack installed: | 45 |
| Storage type(s): | full pallet, partial pallet, 24-inch span single-case |
| Pallet depth: | 1-2 deep |
| Bay bracing: | z-beam |

FRIENDLY COMPETITION

Competitors are finding an increasing number of reasons to rely on each other for logistical help as gasoline prices and carbon emissions remain high.

Known as both collaborative logistics or “horizontal collaboration,” an increasing number of partnerships are forming between industry competitors in order to optimize transportation operations, usually because one company has a geographical advantage over another.

“You can’t just fly your people all over the country all of the time,” Scott Larsen, president of Seattle-

based RH Brown, says. “That doesn’t work. When we go to places like Florida, we have peers – and I guess on some level, you can say competitors – we can call upon to help us get our projects integrated.”

Optimizing transportation costs and reaching a geographically wider customer base by sharing truck capacities and orchestrating client deliveries with each other’s fleets, has not only increased profitability and customer service, but also opened the door to an innovative way of remaining competitive in the market place: by temporarily not competing.

shirts and polo shirts designed for large groups.

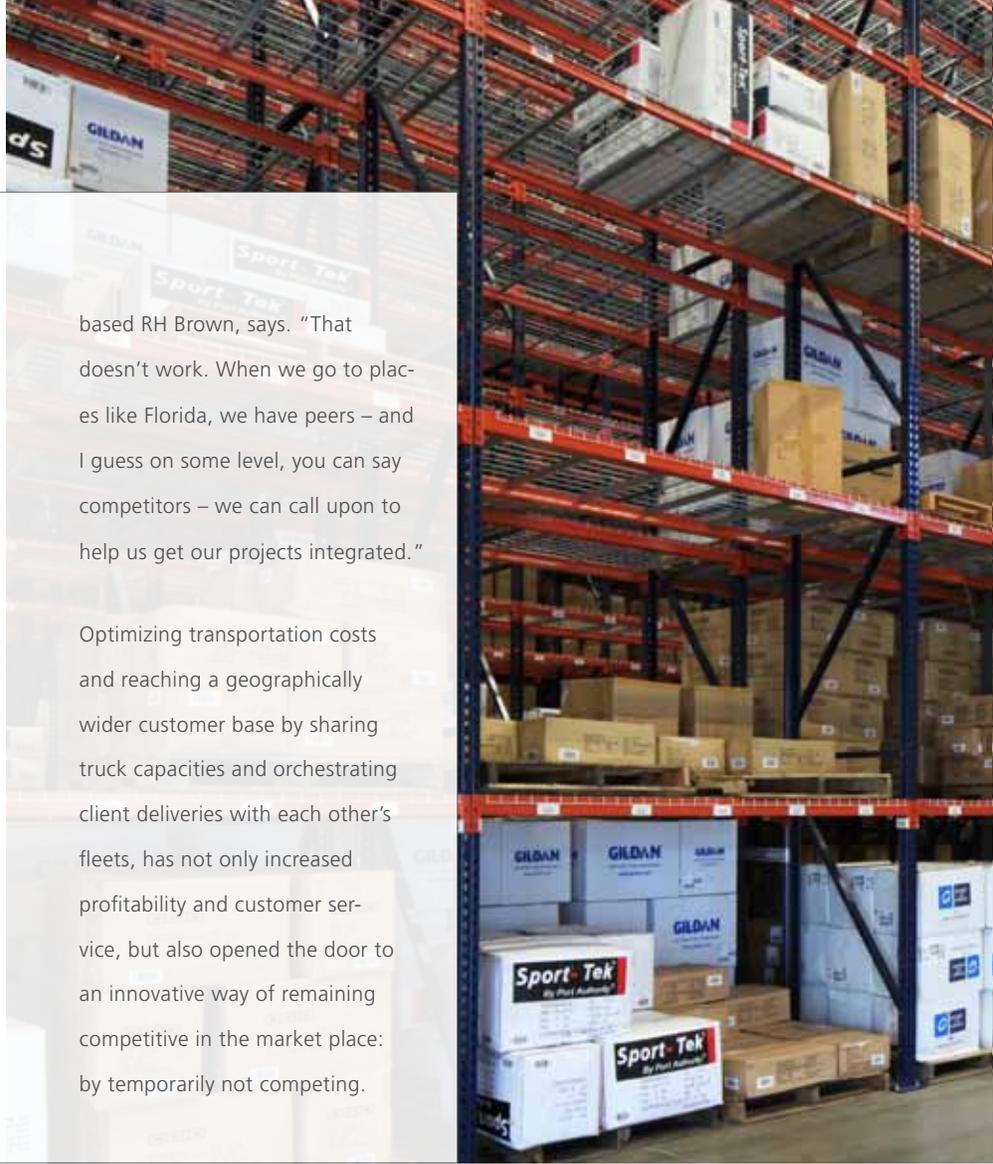
With business expanding nationally, SanMar recognized the necessity to expand its warehouse space, too. Under the current product flow, SanMar receives product by the truckload that is then divided by storage

location. Red shirts, for example, go with red shirts; black sweatshirts go with black sweatshirts and so on. As the product comes off the containers into storage locations, the company then re-palletizes the product according to SKU. The products are then stored on Interlake Mecalux high-height, narrow-aisle, selective

pallet racking according to whether or not they are high-turnover or low-turnover items. The Dallas facility has a primary pick area, which necessitated the bulk storage or full case picks. Part of the 38-foot high-height racking is full pallet, part of it is partial pallet and some of it is single-case.

The company’s desired turnaround speed dictated that each distribution center inventory enough stored product to facilitate getting anything out the door with minimal lag time.

Whether the item in question is a size XXXL neon-green polo shirt or a medium-sized plain white tee, the company’s desired turnaround speed dictated that each distribution center inventory enough stored product to facilitate getting anything out the





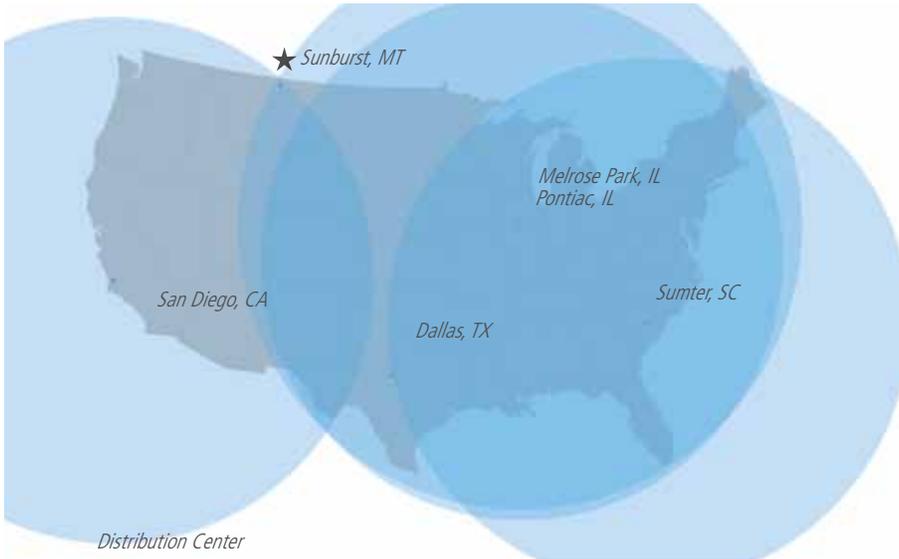
door with minimal lag time, most of the time with less than a day's turn-around. To do that, a lot of product must be on the premises; and to do that, SanMar needed to build out and up.

Pattern of Growth

Few organizations understand SanMar's growth as much as RH Brown, which has worked with the wholesale garment company since its first 2005 retrofit collaboration in Seattle. RH Brown, the systems integrator specializing in turnkey conveyor and storage packages, also calls Seattle home and synchronized with SanMar's patterns of growth enough that after the garment company identified the need to expand into larger facilities in Dallas and Jacksonville, Florida, RH Brown had the goods to expand right along with them. "[SanMar] was looking to build bigger facilities and they needed a partner they could turn to to handle both facilities," Larsen said referring to both the Texas and Florida warehouses,



INTERLAKE MECALUX TAKES THE U.S.



The circles show IKMX's expansive reach throughout the U.S., a fact that RH Brown said made the company most attractive to doing business in both TX and FL. IKMX can even deliver to Sunburst, MT, the farthest geographical point between distribution centers in the continental United States.

ranges, number and volume of SKUs and cube space. Also of notable importance, was the manner in which SanMar wanted to organize the project. The garment wholesaler wanted this installation project organized around its materials and wanted their distribution center managers to be able to continue working unabated throughout the installation. "It was important to SanMar that they had a partner able to insulate the existing operations from having to get involved, while also involving hundreds of other on the contract," Larsen said.

With the design in place, RH Brown worked closely with the contractors in charge of the building's construction in order to ensure the product would come in on time and had a place to go once it arrived. "We actually interfaced quite a bit with the contractor," Larsen said. "A big part of it was the coordination facilitation of the on-site schedule for shipping and receiving product."

"and had the capacity to manage and install both facilities as well as turnkey projects from their entirety."

Saddled with a 300,000-square-foot building in Dallas that was straining

The trick, in this instance, was creating a design and completing the installation before the building was fully erected.

at the seams to handle its product flow, SanMar relocated to a new construction more than twice the size of the old building that allowed a more even flow and efficient operation. The trick, in this instance, was going to be creating a design and completing the installation before the building was fully erected. It was no small trick.

Operating Room

RH Brown identified SanMar's business objectives and enacted a design plan that would encompass those goals. The plan aggregated a number of factors including product capacity, shipping

The difficulties of working around an unfinished building proved myriad: construction of the warehouse went on for weeks with neither an asphalt path (which made deliveries from truck to dock quite difficult) nor a roof (which made safely storing materials risky). In a pinch, RH Brown safely blanketed the rack in tarp outside the facility until it could be relocated indoors. "You can imagine we were taking in about six to eight deliveries a week for a couple months because we didn't have room on-site to store a lot of materials," Larsen says, reflecting on his biggest challenge of the installation.

Inside Out

Once the product made it inside the facility, the installation went smoothly and SanMar was pleased with RH Brown's decision to use Interlake Mecalux shelves. "One of the reasons we turned to Interlake Mecalux for the racking solution," Larsen said. "We needed a solution for the high-bay shelving. A lot of this rack is 38 feet tall with beams every two feet. It isn't high capacity." The solution, in this case, came in the form of z-beams at the ends of the bays. SanMar had been using pallet rack beams to store its products in the previous facility, which was not as reliable.

More than the rack bracing, Interlake Mecalux proved to be the best choice for the installation because, as Larsen

put it, the company had a wealth of regional distribution centers from which to ensure the product could be manufactured and "the logistics to deliver the volume of product." As Larsen went on to explain, the original plan was to complete the SanMar installation in Dallas first and then immediately complete a similar installation in Jacksonville, Florida. After several schedule changes related to weather or other unforeseeable matters pushed the Dallas installation back and forced both installations to coincide with one another, Interlake Mecalux proved to be the right choice again. "These two projects combined for the biggest job we've done [with SanMar]," Larsen said. "Mecalux had the capacity to get that material out. I'm sure there are people out there that wouldn't."

Almost immediately, SanMar saw its efficiency rise and its daily turnover capacity skyrocket. Today, the garment wholesaler turns over more than four times the orders it did in the original Dallas facility, a feat only partially explained by the increase in storage space. It isn't just the space, but the optimal layout, the durability of the rack and the company's increased storage capacity.

As the clock creeps ever closer to noon in the garment distributor's new facility, there's a chance that despite working as if they are running on Pacific Standard Time, these SanMar employees will clock out at Central Standard Time, as they've become just too efficient to necessitate staying any later. 





A ROLLING CENTURY

What started as a small wheel manufacturer has evolved, 100 years later, into a full-scale systems integrator with a few new tricks up its sleeve.

Scott Larsen is a fourth-generation owner of RH Brown, a racking distributor celebrating its 100th anniversary. Actually, Larsen would almost certainly take issue with the term “racking distributor,” as the Seattle-based company has worked tirelessly to become better known as a systems integrator; essentially

a turnkey provider of not only services, but of finding hidden value. “We get to know what our customer’s objectives are,” Larsen said, “and really get to know their business so that we can really help the client decipher what their options are for material handling systems and how they may benefit their business.”

Founded in 1911, RH Brown began manufacturing industrial wheels, wheelchairs, bicycles and the like – a division still present within the company. As time passed and industries became increasingly segmented, the company branched out from simple wheel production to create conveyor systems for industrial use starting in the ‘60s. By the 1990s, RH Brown absorbed industrial steel rack distribution into its business. In the last 10 years, the systems integrator adopted more systems to integrate by not only distributing industrial shelving, but installing it as well. “That’s been a huge asset to our business,” Larsen says about that particular expansion. “Bringing those services in-house gave us control over the projects and job sites. So if the project is not so large that it’s just a full-time management position, we can actually return some value to the customer by leading and helping with the installations.”

About 2/3 of RH Brown’s clientele hail from the Washington/Oregon area, but the company’s recent expansion eastward is proof positive that its dedication to adding value has been successful; as company’s expand, they bring RH Brown along to help them. Indeed, some clients cannot remember a time they were without RH Brown’s services. “One our suppliers,” Larsen says, “they’ve been a supplier of ours for, I think, 97 years. It’s pretty crazy that we’re both even still around.”



HOLDING THINGS TOGETHER SINCE 1976.



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3PL To Yuma

Third-party logistics company Desert Depot sees alternatives and growth in agriculture.

By Dave Batka



Until the Industrial Revolution, agriculture was the primary trade for much of the world's population. Even today, there are roughly 5 million acres of US land and 2 million employees devoted to some facet of farming. Desert Depot, a subsidiary of the Gowan Company, is a key player in the agricultural chemicals market. The provider of custodial warehousing for clients' products, Desert Depot has been a third-party logistical enterprise in Arizona's foreign trade zone (FTZ)

since 1996. Residence within a FTZ allows customers to store imported, raw, active goods and gradually import them in order to produce the finished product. Desert Depot stores an array of products during its transformation from both active and inert ingredients, down to the packaging and merging them together. The company's storage needs are not common to the typical warehouse, given the drastic range in both the product container's size and shape.



TECHNICAL DETAILS

| | |
|--------------------|---|
| Type of system: | Push-back |
| Pallet Dimensions: | 40 in. x 48 in. 48 in. x 48 in. 48 in. x 52 in. |
| Load Dimensions: | 40 in. x 48 in. 48 in. x 48 in. 48 in. x 52 in. |
| Total height: | 288 in. |
| Total weight: | 1000 – 2000 lbs |
| Pallet capacity: | 16,000 – 20,000 |
| Year Installed: | 2009 |

From Birth to Earth

Desert Depot's functionality has been designed around its customer's needs. While storing the life blood of its customers' business, the company also performs much of the logistical processing of raw goods into finished products, ready for consumer use. The raw ingredients belonging to one of Desert Depot's chemical manufacturers may arrive in a variety of containers ranging from super sacks to drums. It is then stored until they

are in need of supply. The chemical is then loaded onto a tractor trailer truck and moved 10 miles down the road to a sister plant acclimated for synthesizing raw ingredients. Here at the sister plant, the peripherals are mixed and prepared by trained personnel. The final product is then transferred back to Desert Depot in its final state, ready for the retailer to move it on to the consumer. Each product goes on a different plant for a different reason – to stop mildew,

kill white flies, prevent weed growth before emerging from the ground, etc. The typical turnaround time for a raw ingredient to first enter Desert Depot, get mixed and then shipped out to retailers, is approximately six months. All orders ship the same day their releases are sent. At any time, the company stores between 16,000 and 20,000 pallets with an inventory accuracy of 99.9 percent, according to customer auditors, and inventory is continuously updated in real-time. Also, insuring that customer products are always accounted for and has a cradle-to-grave history, every pallet is tracked with a license plate.

Desert Depot's fleet of forklifts were a priority from the outset of the installation. [Opposite] The height of the warehouse allowed double-stacked pallets on the rack's top level.

Wasted Outgoings

Despite serving some of the largest players in the industry, Desert Depot's General Manager Dick Ponschock still felt branches of the business could be trimmed. Having been with Gowan since 1997 and taking over Desert Depot's combined 215,500 square feet of facility space 10 years later, Ponschock recognized that their third space, a nearby 57,000 square foot warehouse they were leasing, was costly and inefficient. He made it his objective to plan his way out of it. Plans couldn't be set into motion however until the lease on the space had elapsed. With 40 years of industry experience and a doctorate in organizational management, Ponschock analyzed the current layout in his main space and saw he could change, among other things, the facility's floor plan in order to increase overall storage density.

"I knew there were better ways to renovate [the] current space than spending rent money on another warehouse," Ponschock said. "I started looking toward the roof and thought there was a lot of cubic feet wasted in my warehouse. We might be full on the square foot, but what if I could go up 1.2 or 1.8 number of pallets... and store everything internally without affecting service levels?"

The key to the renovation was to avoid changing the company's current product flow or material handling equipment, which was made up of standard



5,000 lbs. cushion forklifts. Narrow aisles weren't an option. Ponschock knew there were other approaches, but none of them were too enticing. Knowing there were alternatives to everything, the design needed to be ready to handle inevitable future growth and not simply that of their current inventory. With Desert Depot's pallet sizes being continuously in flux, flexibility was

integral. The system needed to allow for both very narrow and very wide pallets to be stored.

Pragmatic Answers

After a year of analyzing feasible solutions, Desert Depot awarded the overhaul of its 103,200-square-foot space to its longtime material handling provider Naumann Hobbs. Having the Southwest's



largest material handling provider in its corner, the distributor set about conducting an efficiency study for pallet locations Desert Depot's main facility and its off-site storage facility and then modeled their findings into CAD drawings. Shortly thereafter, Naumann Hobbs determined that push-back would be the ideal solution to eliminate the unwanted off-site location.

"The density was one of the main factors," Ponschock explained of the preliminary plans. "We also looked at many alternatives even with racking itself." Geoff Nance, the general manager of Naumann Hobbs, noted that his experience with various rack types compelled him to choose push-back as the best solution to Desert Depot's desire to consolidate. Ponschock added, "If we laid out the warehouse

The new push-back system nearly mirrors the previous configuration, giving the desired extra storage density without consuming vital floor space and fully maximizing previously untapped vertical cubic footage.

from the back, that [layout] would have really handled well, but then, I lost some aisle space. So, push-back ended up being the most efficient from a warehouse space element."

Push-back offers high-density, multiple product storage solutions that optimize all of the available space. Because Desert Depot didn't want to change their forklifts, the telescoping carriages used in push-back utilize gravity to move rear-placed pallets to the front, so drive-in rack or telescoping forklifts are unnecessary. The design allows all the stored products to be accessed from a single aisle in a first-in/last-out order. Also, since Interlake Mecalux offers beams and frames capable of supporting two-, three-, four- and five-deep push-back rack, they can be implemented in a variety of applications, despite given space.

Push-back offers high-density, multiple product storage solutions that optimize all of the available space.

Construction

Hobbs installed 16-foot, three-tiered, three- and four-deep pushback systems, and a five-deep system that was modified for a sixth point, allowing for more than 7,600 pallet storage positions. The height of Desert Depot's space also allowed for a second set of pallets to be stacked onto the highest tier. Industrial rollers were installed on another pushback system, and all

the racks were designed to accommodate a variety of GMA pallets with weights ranging from 1,000 to 2,000 lbs. During the construction, Desert Depot maintained normal daily business operations by systematically clearing out old rack and installing the Interlake Mecalux beams and uprights along with the push-back mechanism, re-filling it with product. "It was great to see that we

didn't have to shut down an area," Ponschock noted of the installation. "We shut down pieces of an area, but we didn't shut down an entire area at all." This process continued until the installation was completed nine weeks later. "We worked all the time – all day, every day," Nance said. Completed in 2010, the new storage system accommodates well over 16,000 pallets, nearly double previous capacity.

When compared to the yellow safety lines marking where the old rack sat, the new push-back system nearly mirrors the previous configuration, giving the desired extra



THRIVING IN THE DESERT

A material handling company still reinventing itself after 60 Years.

Amidst the sprawling desert, speckled with serene mountain terrain, lies the home office of Naumann Hobbs. The once family-owned company has evolved into the Southwest's oldest and largest provider of material handling equipment and services. With age has come innovation and advancement, having started in 1949 in the forklift business, eventually incorporating warehouse, storage and construction solutions. The company expanded into Las Vegas in 1997 with the creation of Inland/Hobbs Material Handling, eventually spreading throughout Nevada and into Southern Utah. Nine years later in 2006, Naumann purchased Hawthorne Lift Systems, giving the company a foothold in California and completing the Naumann Hobbs family. Hobbs' tireless dedication toward meeting their customers' material handling needs hasn't gone unnoticed. They are a repeated nine-year recipient of Arizona's Corporate Excellence Award and have been recognized by Mitsubishi and CAT.

storage density without consuming vital floor space and fully maximizing previously untapped vertical cubic footage. However, they opted to not fully rack the entire warehouse, leaving an area open for incoming active ingredients. Since they arrive in drums, stackability is an option without having crushing or safety concerns.

Nearly two years after the installation was completed, Desert Depot has seen the true value of their renovation double. The company continues to be a logistics safe-haven for its clients. 



Their recent completion of Desert Depot's 103,000-square-foot facility in Yuma, AZ, with Interlake Mecalux push-back rack illustrates why they have survived and flourished for over six decades. Formerly family-owned, Naumann Hobbs is now structured with an employee stock ownership plan. The distributor still primarily services produce warehouses and medium-sized firms like Desert Depot since the late '90s. When the opportunity arose to help change the day-to-day function and storage capacity of Desert Depot's warehouses, Naumann Hobbs stepped up despite concerns from their partner company that their off-site warehouse couldn't be eliminated.

"They were very concerned that we couldn't do what we said we could do. You are talking about someone pulling a big trigger and putting their career on the line as a company," Naumann Hobbs' General Manager, Geoff Nance said. "[The installation] was upwards of a million dollars."

But Nance had confidence that his company could complete the ambitious task and recognized the potential of Desert Depot's

existing space. Though, the road taken had many detours, noting that he went through four managers until finally finding someone who understood his vision for the tenured company.

Naumann Hobbs installed the Interlake Mecalux push-back frames into the Yuma warehouse. Desert Depot already had selective rack in place – selective and push-back unload in a similar manner – but push-back offers greater storage density. Naumann Hobbs won this particular bid and implemented a study of Desert Depot finding a modified push-back system to be the best way to eliminate the off-site 52,000-square-foot warehouse, while increasing total storage capacity.

"[Push-back rack] is beautiful to work with," Nance said. Desert Depot saw an immediate return on investment from its rack installation, given that their storage capacity nearly doubled upon completion. "They are a top-notch organization." The two are currently discussing the addition of truck locks on all of the docking positions at Desert Depot.

A corrugated box manufacturer automates its warehouse and doubles its storage capacity.



Microlan: Thinking Outside the Box

by Marta Jimenez-Lutter

Located in northern Madrid, Microlan started manufacturing cardboard boxes in 1976. Today, the company is a market leader in the flat-stamped corrugated cardboard box sector, creating custom-made, high quality boxes for a variety of industries.

From its inception, Microlan focused on differentiating itself from other box manufac-

turers by highlighting its great products and outstanding customer service. The company crafts all of its products on demand, following the customer's specifications. To make sure the quality of its products exceeds the expectations of its clients, Microlan has consistently invested in state-of-the-art machines to manufacture corrugated boxes, as well as the latest in printing systems.



Microlan record

Microlan's attention to detail and exceptional quality secured its position in both national and international markets. Microlan has clients spanning from France and Portugal to Cuba, where it controls 90 percent of the market for Pernod Ricard, the French manufacturer of high quality spirits. Other brands like Coke, dairy giant Pascual, and one of the oldest Spanish beer manufacturers, Mahou, trust the production of their boxes to Microlan.

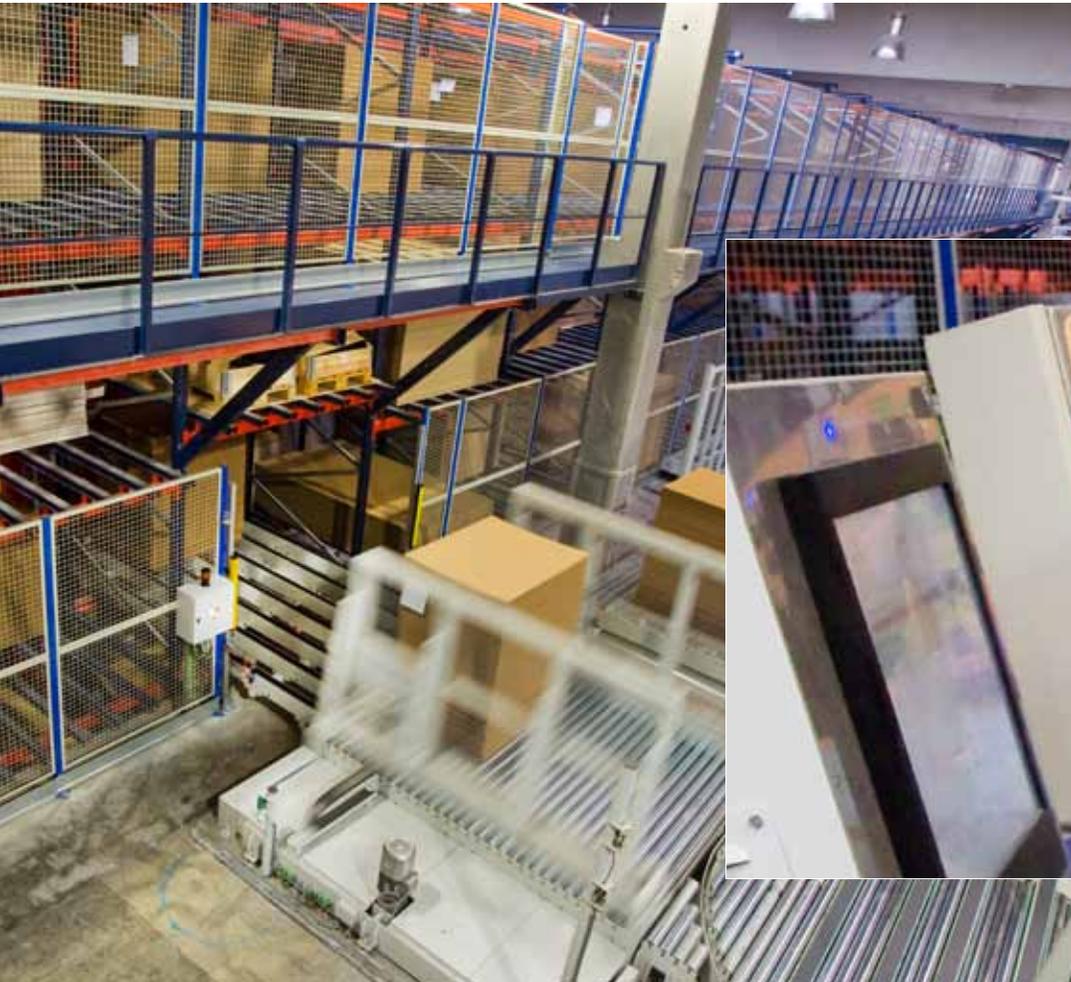
The success of their business meant that by late 2010 the company found itself with a 96,875-square-foot warehouse needing to be modernized. Rather than expanding the dimensions of the warehouse, Microlan decided to automate the space they had. Automation would allow them to utilize their existing floor plan in a more efficient manner without going through the disruption and cost of building an addition.

Miguel Angel Saavedra, head of the automated warehouse solutions division for Mecalux Spain, explained the manner in which the installation process for this project was scrupulously planned. "The plant is a fully functioning manufacturing facility that stores products in the middle of being turned into custom boxes," he said, adding that Mecalux did not want to disrupt the manufacturing process during the complicated installation. Microlan sees a constant daily movement of more than 240 pallets that are produced, printed and shipped to the customers on a set schedule. "This meant that the implementation of any changes had to be executed in stages because production could not be halted," Saavedra said. "Mecalux established a

Francisco Sahagun, factory director for Microlan, explained the importance of their machinery when trying to achieve the highest quality possible. "The boxes are like custom suits, they are made to order," Sahagun said. "The client orders a specific box with a particular image and we make exactly what they have ordered. They give us the information

they want on the box and we have to transfer it and adapt it to the printing system." The process is completed meticulously, leaving no room for error or misrepresentation of the product. One of the worst mistakes a company like Microlan can make is misspelling Coca-Cola's name or printing a Pernod Ricard box using the wrong font.

The success of their business meant that by late 2010 the company found itself with a 97,000-square-foot warehouse needing to be modernized.



The Microlan plant is managed by the client's WCS, which is a programmable logic controller that communicates with the Mecalux Group's Easy WMS software.



delivery system on the weekends to avoid disturbing the factory production.”

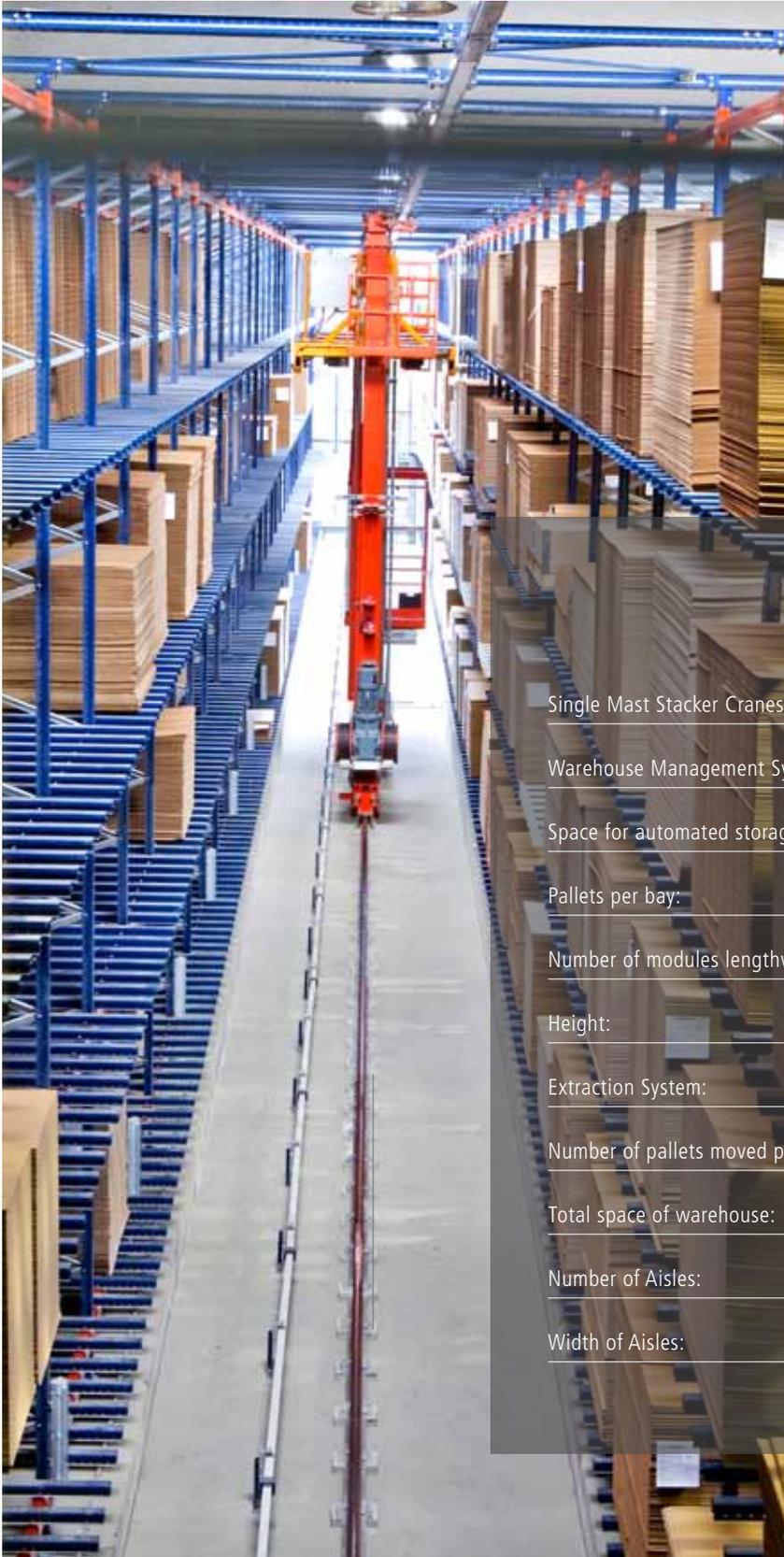
Automation Operation

Mecalux planned an automated installation measuring over 26 feet high to accommodate the level of pallets that Microlan needed to store. The problem was that the municipality of San Sebastian de los Reyes, where they are located, did not allow that construction height, so Mecalux designed and constructed a pit 6.5 feet deep to make up for the difference. A section of the factory that contained conventional rack was sectioned off, the old units were taken down and

a concrete company was called to dig the hole for the automated section. A tarp was erected to separate the construction area and keep the noise and dust out of the production plant. Miguel Saavedra explained how the hole for the new storage system was used to keep the new construction from disrupting the manufacturing process “The pit was very convenient during construction, as it was used to store all the materials and keep them away from factory activities while the warehouse was being remodeled.” Saavedra also explained how material delivery was organized to avoid disruption of production, “We spaced out the

delivery of the stacker crane and the shelving units over several weekends. The new pieces would be delivered Saturdays and Sundays and stored in the pit so Mecalux workers could have them on Monday. That way we did not bother Microlan factory workers during regular production times Monday through Friday.”

The company also had to make sure the system was working correctly before they made the transition. If something wasn't working properly, they would have backed up orders and unfulfilled deadlines, resulting in subsequent economic loss.



Automation would allow Microlan to utilize their existing floor plan in a more efficient manner without going through the disruption and cost of building an addition.

TECHNICAL DETAILS

| | |
|---------------------------------|-------------------------|
| Single Mast Stacker Cranes: | 1 |
| Warehouse Management System: | EasyWMS, Galileo |
| Space for automated storage: | 6,815 sq.ft. |
| Pallets per bay: | 3 / 4 |
| Number of modules lengthwise: | 31 |
| Height: | 4 levels |
| Extraction System: | 6 (3+3) telescopic fork |
| Number of pallets moved per day | 244 |
| Total space of warehouse: | 96,875 sq. ft. |
| Number of Aisles: | 1 |
| Width of Aisles: | 9.19 ft. |

The growth of the business required them to have a better organizational system to locate, retrieve and move the materials needed for the boxes.

The final phase will be the integration of the systems with the Mecalux warehouse management system, EasyWMS. The software represented the final piece, allowing the warehouse to reach full integration and realize 100 percent functionality at the end of October.

Automate the Old, Optimize the New

Before Mecalux installed the automatic warehouse, Microlan operated using a basic process flow. When the cardboard came out of the corrugator machine, it was piled on pallets and transported with a forklift to an open area in the warehouse, stacking the pallets on top of each other. The growth of the business required them to have a better organizational system to locate, retrieve and move the materials needed for the boxes.

The plant is now managed by the client's warehouse control system (WCS) and it communicates with EasyWMS through a programmable logic controller (PLC) managed by the Mecalux Group's Galileo software. Microlan's WCS sends the information to the Mecalux PLC both for entry and exit of pallets into the warehouse. Galileo reads this information in its PLC and sends it to Easy which takes the corresponding action: entry or exit.

Mecalux also automated the flow of merchandise around the warehouse. A transfer cart picks up the piles of cardboard from

the corrugator in the production area and takes them to the Mecalux area through a system of conveyor belts. When they reach the storage area, they are placed on one of three intake tables. The WCS sends this information so EasyWMS can register it in the system, locate a space in the shelf for it, and generate an order to store the pallet. The Mecalux automated area stores the cardboard used for the boxes before being printed and where they return after it is printed, waiting for the die-cast.

The exit operation is even easier: when an extraction order is received by the client's WCS, EasyWMS generates an extraction pallet order for the requested pallet to the indicated table. With the installation of the automatic warehouse, the process has been streamlined and there is no longer a need for forklift transport.

The pallets are placed and extracted from the storage shelving by a stacker crane. As Sahagun explained, they needed a very specific type of stacker crane, one that would be able to reach in 6.5 feet and lift loads weighing over 5,000 pounds, all while making sure not to damage the product. Mecalux was able to manufacture a single mast stacker crane according to these specifications. The specially designed crane is able to transport those 5,000 pounds in a very gentle and seam-





The specially designed stacker crane (top) covers a four-level high area and distributes goods that are then carried through a warehouse space almost 270 feet long.



less way. The space dedicated to the automated storage is 262 feet long by 26 feet wide and has a storage area that raises four levels high.

Microlan Scape

Sahagun indicated that the warehouse is now more open, clean, organized and, most importantly, completely automated. These changes have resulted in a more efficient production flow and better organization of stored items in the manufacturing process. Sahagun said the installation of the new system went without a hitch, the project was on time and without any incidents and the company has been

able to double its storage capacity, which will give them some flexibility in case of a breakdown in the system. "Before, we were able to store boxes for the production of just one day and now, with the new warehouse, we can store materials to last us almost two days," explained Sahagun. "This is very important and it gives us more options [...] we are better protected."

With over 130 employees working toward growth and innovation, the new automated warehouse system will enable and promote the expansion of the company for years to come. 



Bringing It All Back Home

An Alimerka expansion resulted in a brief profit dip and the need to reshuffle company operations. With help from Mecalux, the supermarket chain maximized its network by re-consolidating it under one roof.

By Marta Jimenez-Lutter

In 1986, Alimerka opened its doors in the northwestern Spanish region of Asturias. With 14 employees, the supermarket chain began its operations under the leadership of its founder Luis Noe Fernandez. Today, Alimerka ranks sixth among companies with the largest net revenue in Asturias. Its staff has grown 10 percent annually over the last 25 years and it now has nearly 5,600 employees – the largest private employer in the region – with over 185 stores, greenhouses and a center for the production and distribution of frozen dough.



Alimerka, the sixth most profitable company in the Asturias region, an area about the size of Iowa City, Iowa, employs about 8 percent of the region and has the storage capacity to distribute to the remaining 92 percent.



Fresh and natural products have been the main concern for the company long before the trend toward organic produce and meats took off. The Alimerka group manufactures 500 of the products it sells and provides fresh fruits and vegetables through a partnership with Codefrut-owned greenhouses.

The fresh bread sold at their stores comes from another partner, Masas Congeladas, where the dough is manufactured and shipped frozen to the supermarkets to be sold freshly baked every day. The company has also been providing free range chicken and fresh meats to their customers for years.

20 Years of Growth

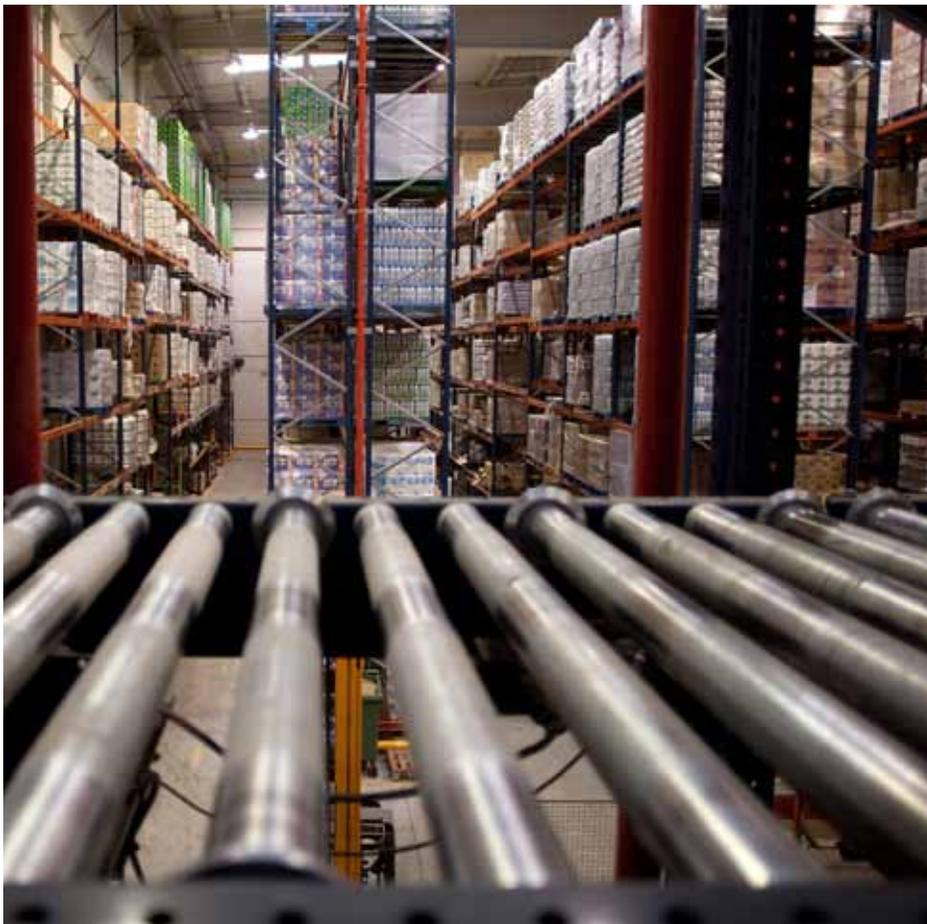
For the past two decades, Alimerka has counted on Mecalux to provide storage management solutions. With five logistics platforms built by the storage company in the towns of Colloto, Benavente and the newest

one in Lugo de Llanera, Mecalux has been both witness and partner to the growth of the supermarket leader.

By 2006, Alimerka identified that the company's unprecedented growth was exceeding its storage space, or as Emilio Llano, Alimerka's director of logistics, explains: "Limitations of space in our installations made us incorporate satellite warehouses to absorb the growth

of volume and work that we were experiencing." It wasn't long after that the company's expansion proved to be a restrictive strategy. In an effort to consolidate store shipments, the company expanded its network, but in so doing, also increased the number of product transfers from one satellite storage site to another. This process proved time consuming, inefficient and an impairment to additional growth.

Mecalux and Alimerka gathered all the satellite storage centers that were located in different spaces and united them under one roof.



In order to help Alimerka save time transferring shipments from one satellite station to another, Mecalux analyzed every facet of their current location, storage and distribution methods and determined that the food company would run out of storage space and room for its personnel within the year. The study was presented to Fernandez with a proposal that would reverse the decision to create satellite sites, instead bringing in a hybrid system, mixing dynamic rack with selective rack and having each piece integrated using Mecalux EasyWMS software.

Building Down, Not Out

When Mecalux started planning the construction phase of the warehouse, they found that the building code of the municipality of Lugo de Llanera limited construction heights to 45 feet. This posed a problem since the elevation needed for an automatic warehouse was 69 feet

The hybrid systems implements into the facility allowed Alimerka to condense its satellite locations and function in one space using Easy WMS software.



high. Having to make up the difference, Mecalux created a plan to dig the necessary 23 feet below street level to be able to accommodate the height they needed and comply with the municipality building codes. Once the plan was designed, conferred and agreed upon by all necessary parties, the foundation excavation was underway.

Mecalux and Alimerka gathered all the satellite storage centers that were located in different spaces and united them under one roof. The logistic center was divided in four sections according to the different products stored: dry products, fish, meats and fruits and vegetables.

In a lot over 1 million square feet, the company began construction of a 312,153-square-foot warehouse with a 53,819-square-foot annex for the production and distribution of frozen dough. The frozen dough

plant produces 1,763 pounds of baked goods and 13,227 pounds of dough per hour.

To establish a system of synergy between all of the new sections, Mecalux installed a radio frequency device connected directly to its Easy-WMS software with a pick to voice system allowing the hands free manipulation of the orders. The installation of this warehouse management system enabled Alimerka to have

full control over the stock, production and order status in real time. The system guides each product to their correct location according to their nature. In this way, the operation of the warehouse was faster, being able to handle more than 7,200 pallets a day with a traffic flow of 250 vehicles. By synchronizing the reception time, expedition time and supply chain, the company was able to lower its operating costs and increase its efficiency.

TECHNICAL DETAILS

| | |
|-----------------------------------|-------------------------------|
| Pallets per day: | 7,200 |
| Warehouse: | 312,153 sq. ft. |
| Production Plant: | 53,819 sq. ft. |
| Stacker cranes: | 4 single mast |
| Conveyor belts: | 42 |
| Warehouse Management System: | EasyWMS system with RFID |
| Levels of conventional rack: | 6 |
| Levels of dynamic rack: | 5 |
| Conventional storage for dry food | 5 to 6 levels of dynamic rack |
| Conventional storage for fruit | 5 levels of dynamic rack |
| Frozen storage | 5 levels of dynamic rack |

With Alimerka's New cold storage system, clients receive all their products with guaranteed freshness.

Armed with its EasyWMS system, Mecalux installed four single-mast stacker cranes that move along the aisles and perform functions of entry and exit of the merchandise for full pallets, half pallets or individual box preparation. Three of these stacker cranes take the merchandise to carton flow

picking areas where the workers perform the picking operations requested by the EasyWMS system. The other stacker crane is dedicated to move half pallets and take them to the picking area. There are also 42 conveyor belts that allow the distribution and transportation of products according to the demand.

The different sections of the warehouse were completed in two phases: the frozen dough and frozen food section was completed in 2010; everything else was completed in 2009.

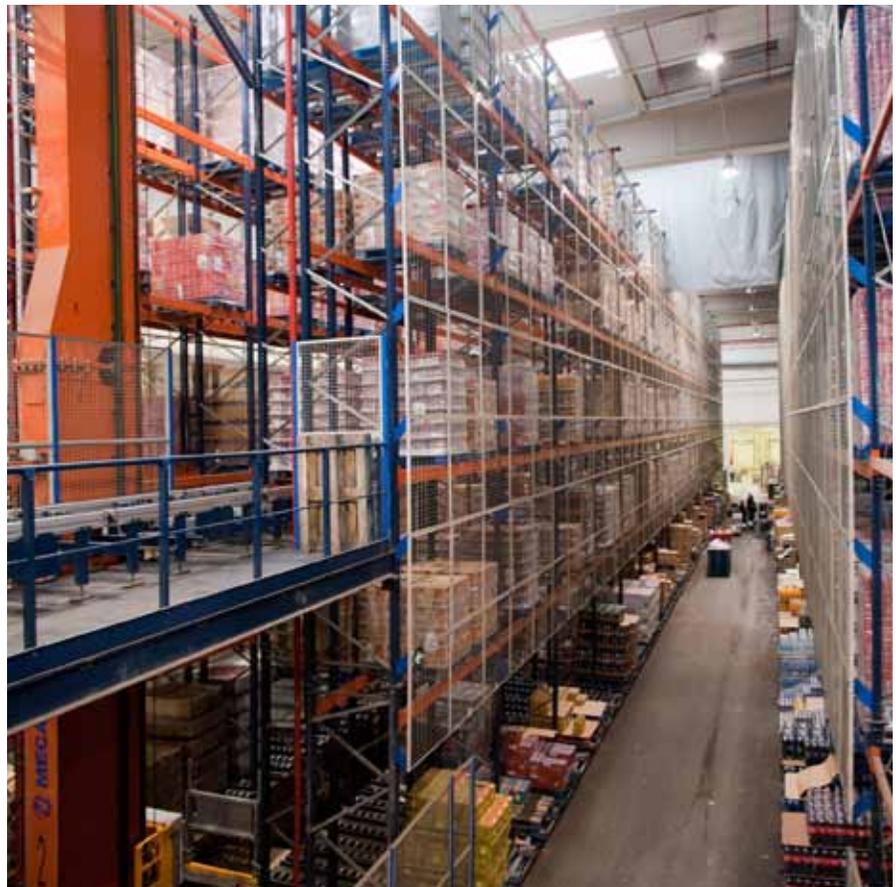
Llano listed the advantages of the new warehouse as having "vastly

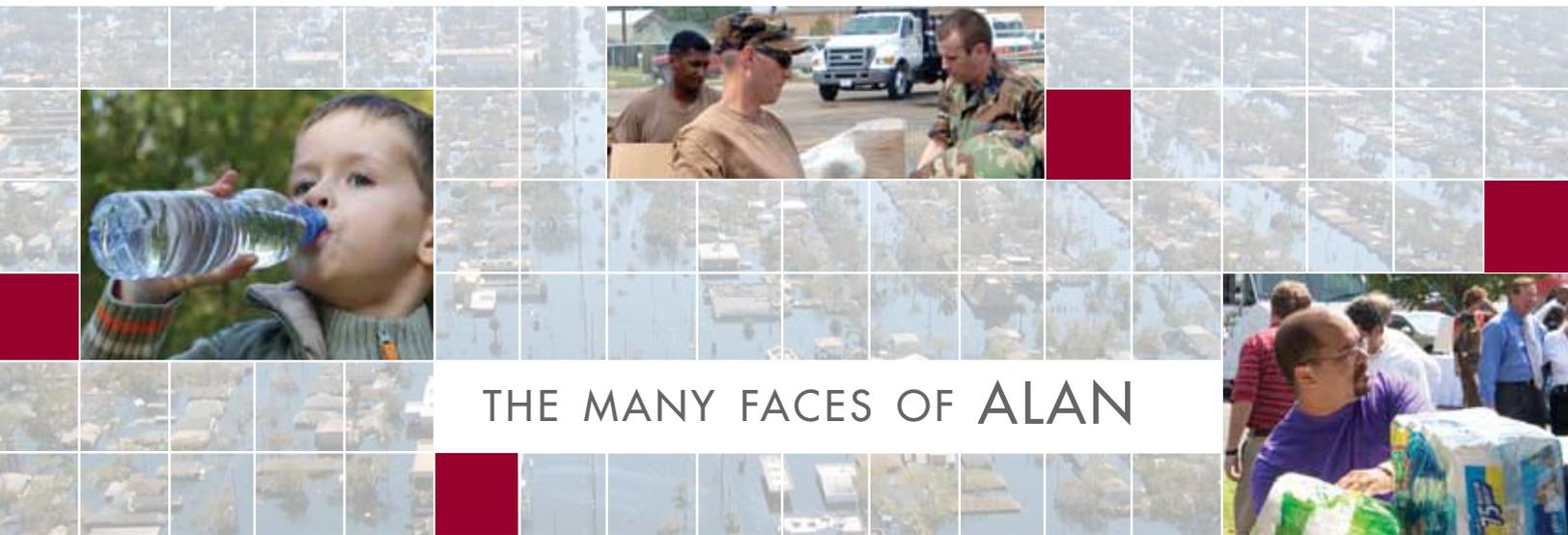
improved organizational flow and logistics tasks." He also highlighted Alimerka's ability to serve its clients more efficiently as the best part of the new warehouse.

Llano is proud to point out that with Alimerka's new state-of-the-art cold storage system and a fleet of refrigerated trucks, its clients are sure to receive all their products with guaranteed freshness.

Alimerka's warehouse structure was designed to assume important growth in years to come, so the supermarket stalwart is now able to grow its business without expanding its space. 

Mesh zone enclosers protect against the possibility of loose products, pallets or materials shed by the action of machines.





THE MANY FACES OF ALAN

Join us. Support humanitarian relief.

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Our goal is to bring supply chain professionals together — helping others in need, finding solutions in times of crisis. We provide a central point of contact during natural disasters and an effective process for distributing donations... putting resources in the hands of those who need them as efficiently as possible.

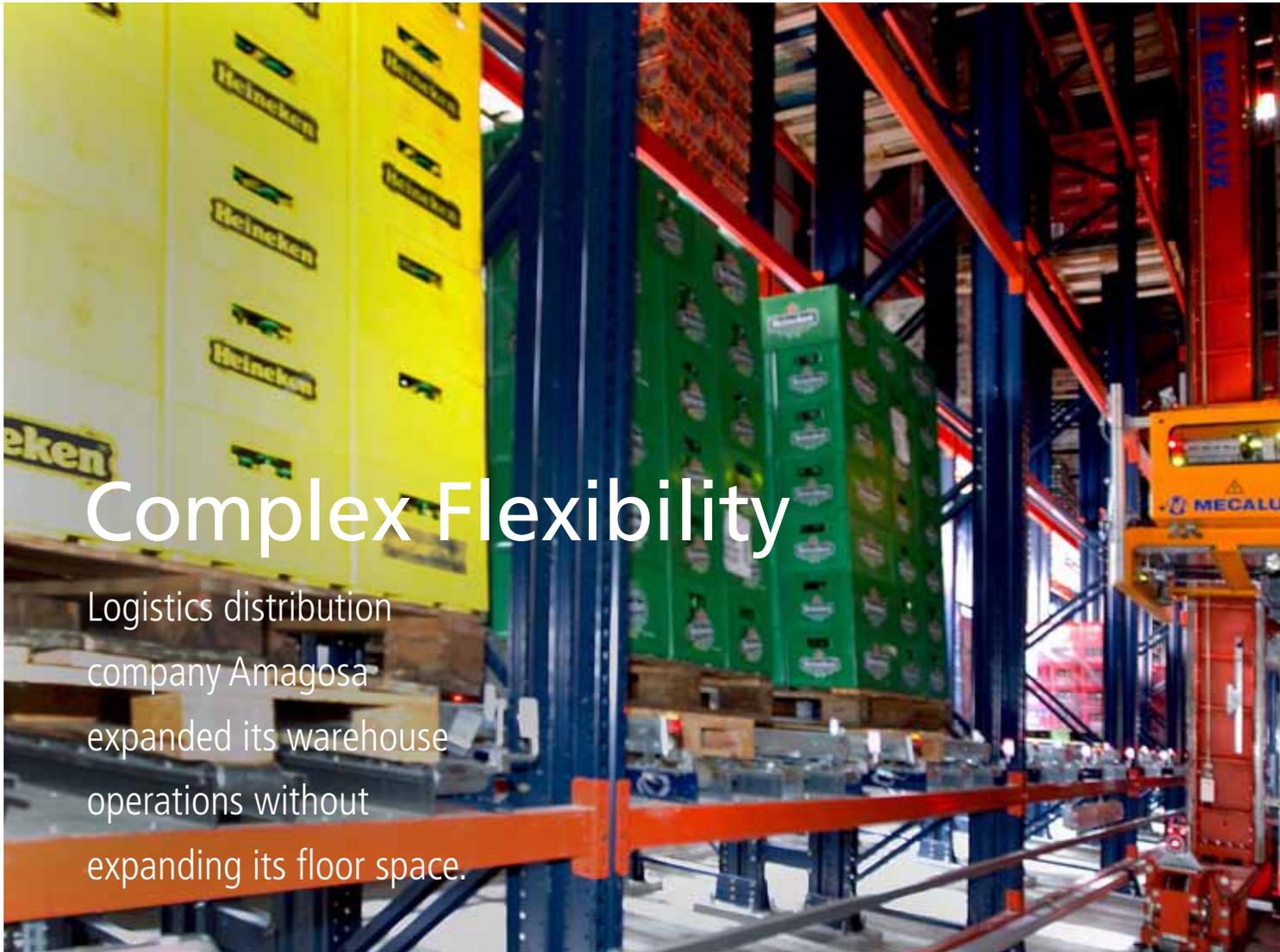
Our website provides a convenient portal to facilitate donations. Whether you can provide logistics expertise, supplies, vehicles to haul them, or local warehouse space to store them, we can match your resources with regional needs.

Become one of the many faces of ALAN.

As a non-profit organization, we depend on people like you to continue our good work. We need your help — with product or service donations, the gift of time or talent, or financial support. Sponsorship opportunities are available at a variety of levels. Learn more at www.ALANaid.org.

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Complex Flexibility

Logistics distribution company Amagosa expanded its warehouse operations without expanding its floor space.

by Marta Jimenez-Lutter

Created in the 1980s, Amagosa Distribution and Logistics is a family-run company located in Badajoz, in the South of Spain. The company takes its name from the founder's wife Ana Maria Gomez Sanchez (A-Ma-Go-Sa), but is led today by the founder's son, Alfonso Lozano Gomez. What started as a small logistics operation, distributing some wine and a couple of soft drink brands, grew over 25 years into a major distribution business that not only serves other distributors, but marquee clients like Coca-Cola and Heineken.

Like many small family companies, Amagosa's business took a great amount of hard work, yielding only minor benefits at the outset. During the late '80s and early '90s, the company was earning around \$417,000 in revenue. The flashpoint for change came once they were assigned as official area distributors for Coca-Cola and Heineken in 2000. The hard work continued and their profits increased. Nowadays they have an average profit of \$16.5 million per year.



Amagosa sped up the installation process and put in the second stacker crane months in advance, partially so that it could rent out space and services to other companies.

As the company grew, it had to adapt its installations to accommodate expansion. By 2009, Amagosa had run out of space and needed to reorganize their logistics operation. The company's main goals were to organize products efficiently and eliminate human error as much as possible. Amagosa looked to Mecalux for direction on how to improve its newest management challenges. Mecalux proposed to change the old rack units for a new automated warehouse, equipped with a stacker crane, two Clasimat units and inventory managed by

its EasyWMS software. Amagosa targeted a parking lot adjacent to the existing plant, for the construction of the new warehouse.

Construction of the new facility began near the end of 2010 and continued through June 2011, a process that might have taken longer had there not been a built-in flexibility to the construction plan. Mecalux cleanly added elements to the original installation plans as the project developed; the biggest of which came when Amagosa decided to install two stacker cranes instead of one. Amagosa would install the first stacker crane immediately and the other one a year later. Miguel Saavedra,

responsible for overseeing automated installations for Mecalux in Madrid, suggested that they put in place the structure needed for a second stacker crane at the same time as the rest of the new installation, "When Mr. Lozano approached us with the idea for a second stacker crane down the line," Saavedra said. "I had to encourage him to do the preliminary installation with the other stacker crane. It would be much more cost efficient this way and less disruptive for their regular warehouse operations."

This proved to be a beneficial idea. The timeframe for the second stacker crane's installa-

The company's main goals were to organize products efficiently and eliminate human error as much as possible.

“We have achieved great storage capacity and we want to try and make our warehouse a logistic center for other companies.”

~Lozano Gomez



The Mecalux Group's Clasimat VLMs easily integrated into Amagosa's more traditional upright aesthetic.



tion changed when Amagosa quantified the benefits of its first stacker crane. Amagosa, impressed by the immediate rise in efficiency, decided to forgo the initial plan to install the second crane in June 2012, opting instead to install the second stacker crane several months ahead of schedule. The reasoning behind it was two-fold: on one hand the second stacker crane would

be helpful during the busy time of the summer months, when the machines have to work non-stop to fulfill all the picking orders. On the other hand, there was a unique opportunity to utilize their state-of-the-art facility to perform the logistics for other companies. This would entail renting out both space and

logistics services to other businesses for them to store their products in the new automatic warehouse, using the second stacker crane and the matching area of the new facility. Lozano Gomez said that he saw a business opportunity for growth in their new installation. "We have achieved great storage capacity and we want to make our warehouse a logistic center for other

companies," he said, explaining that, "we have a lot of room left now that we've automated the storage and can help out other companies that need an efficient way to manage their inventory."

Whether it be manual, automatic or Clasimat, only one type of SKU is stored; the products in the Clasimat are not the same as the ones in the automatic or the manual. Lozano Gomez explained that there are 700-800 SKUs received, stored and distributed in the warehouse. Some products are received in pallets and distributed in boxes; a few others are distributed in pallets as well. Some products, however, are received and shipped in small quantities; these SKUs are stored in Clasimat. Lozano explained the reasoning for this, "We use the Clasimat units for products with low rotation that are received in small quantities. A 12-year-old Chivas Regal is not ordered or stored in whole pallets; our clients order one

TOP 10 ADVANTAGES OF AMAGOSA'S NEW WAREHOUSE:

- | | |
|--|---|
| 1. Efficient use of space and increased storage capacity | 6. Fast preparation and shipment of loads |
| 2. Maximum access to stored products | 7. System reliability |
| 3. Precise and constant inventory control | 8. Practically non-existent maintenance costs |
| 4. High availability and productivity | 9. Reduced operations and labor cost. |
| 5. Ability to track loads from beginning to end of storage cycle | 10. Minimum impact on the environment. |

or two bottles at a time. This storage system saves unnecessary movements of stacker cranes.”

The new warehouse system is completely automated. The product is received in complete pallets and stored in the automatic rack. When the orders are issued by the client, the EasyWMS system creates a list for picking. Usually the clients order boxes of cola or beer, not pallets, so the requested amount of boxes is extracted from the pallets and these are then returned to their place in the automatic shelves. In the Clasimat and manual warehouse, the same operative system is in place for the SKUs stored.

In the dock area, pick-to-light devices have been mounted in each bay. This system of display devices are connected to the EasyWMS management software. The extraction orders are sent from the WMS to the displays, so the operator knows at all times the quantity of units to be extracted and the position where they are located. Once the job is finished, the operator must press a button on the side of the display to validate the order or correct the stock if there is not enough material. This also indicates

that the order is ready and frees the dock. The merchandise is extracted depending on its ability to be piled up; the heavier merchandise comes out first and goes in the bottom, with the lightest loads going on top.

In total, a distribution center was installed with eight storage levels, capacity for three pallets per storage bay and 25 modules aligned lengthwise. The new system would allow for storage and management of 2,400 pallets with a double-deep load manipulation system. Fifteen picking stations were installed at the end of the aisles in the automatic part of the ware-

house, which allows for 15 trucks to be loaded at the same time.

With the automation of the facility, Amagosa was able to compress 2,000 m2 (21,527 square feet) of storage into an efficient automatic system, occupying only 700 m2 (7,534 square feet). So, while the new system occupies less space, the automation allows the company to handle more pallets more efficiently.

With a fully integrated automated space and a new business venture providing logistics to other companies, Amagosa is equipped to face the next 30 years of development and expansion. 

AMAGOSA'S NEWFOUND EFFICIENCY

.079 pallets per sq. ft.

Before Mecalux: 21,527 sq. ft. was used to store the system allowing Amagosa to produce 1,700 pallets per day.

.319 pallets per sq. ft.

After Mecalux: Only 7,534 sq. ft. was used to store the new system, yet Amagosa still produced 700 more pallets per day than they had previously.



By automating part of Amagosa's storage facility with narrow-aisle stacker cranes, the company was able to efficiently store and turnover more goods using less floor space for storage.

MECALUX IN SPAIN

Having originated in Spain, with a 2,150 square foot workshop in Barcelona in 1966, the Mecalux Group still calls Spain home. Mecalux has expanded its sales offices worldwide, in over 70 countries, "...offering advanced storage and automated warehouse solutions to some of the biggest companies around the globe." In the 1990s, the Mecalux group opened its 161,500 square foot logistics warehouse in Barcelona and eventually made it the home of the Mecalux 5 showroom, where the company displays its progressive R&D prototypes.

The last decade has been a whirlwind for the company with its expansion into both the software and automation industries in addition to the formation of Interlake Mecalux in the United States. With plans of setting up new sales offices in untapped regions around the world, slowing is not in sight for the Mecalux Group.

Fueling Sales of Fuel Cells

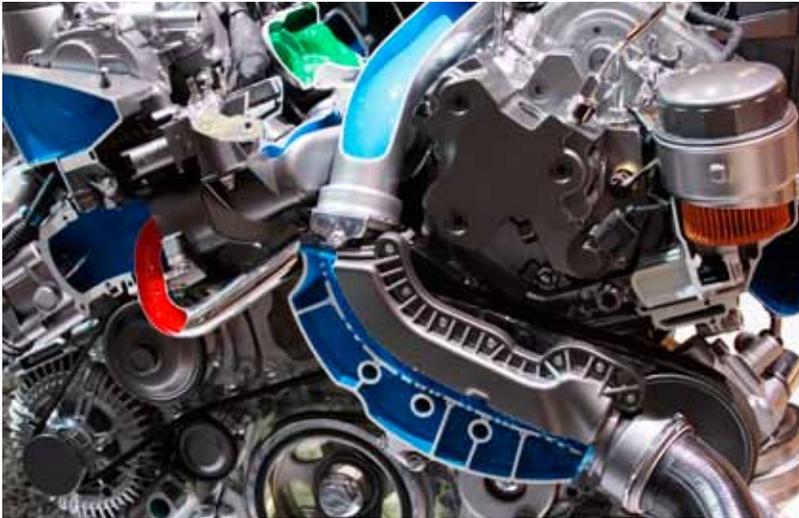
Fuel cells have flown past most other forms of alternative energy on the wings of their value to the auto industry. Recent trends show it's been the materials handling industry – not automobiles – spinning the propeller.

by Adam Shafer



Fuel cells are leading the way in alternative energy innovations, the U.S. is leading the way in patents on fuel cell technology, and the last three years have patched together a mighty boon on fuel cells industry-wide. America is investing a relatively large amount of money in fuel cell research in order to offset the oil it consumes and will continue consuming for the foresee-

able future. In a nutshell, the U.S. consumes a quarter of the world's oil supply despite controlling only 3 percent of the world's reserves and constituting only 4.6 percent of Earth's population. With the upward trending costs of tapping into foreign oil reserves outpaced only by the percentage of imported oil the U.S. is projected to consume, American industries have started



Tiggy Gallery/Shutterstock

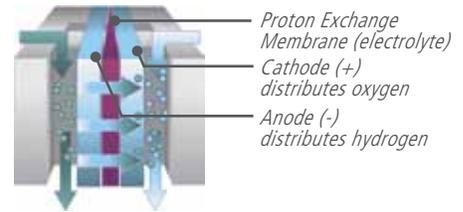
deploying, or determining how to deploy, fuel cell technology. Though it will almost certainly be automobiles that eventually bring fuel cells into the homes of average consumers, it has so far proven to be the warehousing and manufacturing industries bringing fuel cells to the automotive industry.

Eric Jensen, the director of research and development for Crown Equipment, a leading manufacturer of electric lifts, said in an interview earlier this year that the material handling

industry is hidden behind many other more consumer-driven industries. "You see advances in fuel cell technology for the automotive industry," Jensen says, "and it ends up on the front page. But I believe materials handling is leading the way with fuel cells for the automotive industry." Jensen may have a point. Not only did Crown unveil a whopping 20 product models that are able to run on fuel cells, but mega corporations like Wal-Mart, Coca-Cola, Sysco and FedEx have already invested a significant amount

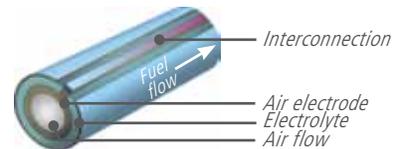
Though it will almost certainly be automobiles that eventually bring fuel cells into the homes of average consumers, it has so far proven to be the warehousing and manufacturing industries bringing fuel cells to the automotive industry.

Figure 1: THE THREE FUEL CELLS POWERING FUTURE WAREHOUSES



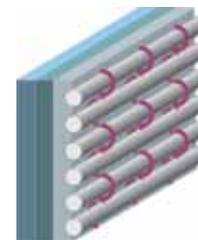
Polymer Exchange Membrane Fuel Cell (PEMFC)

- Leader in transportation applications
- Low Temps (140-176°F)



Solid Oxide Fuel Cell (SOFC)

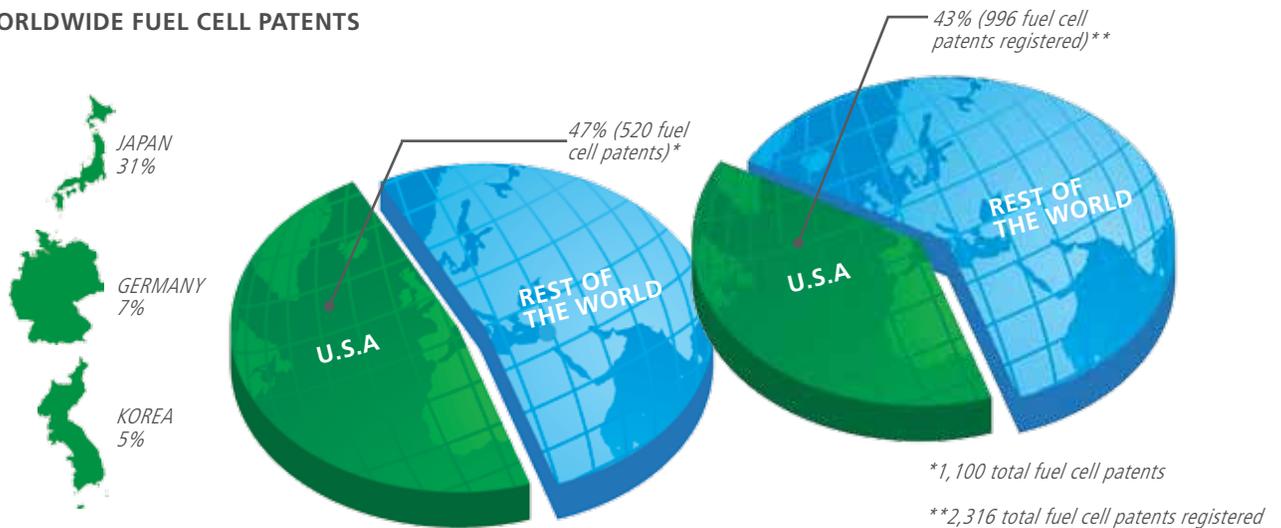
- Capable of providing electricity for factories/towns
- Hot Temps (700-1000°C) make it better to be continually used
- Longest operating life
- The steam produced by the fuel cell can be channeled into turbines to generate more electricity (CHP)



Molten Carbonate Fuel Cell (MCFC)

- Best for large, stationary power generators
- 100-104°C cooler than SOFC—therefore requiring cheaper, less exotic building materials
- Also utilizes steam, but likely produces 14-40% less than SOFC

WORLDWIDE FUEL CELL PATENTS



SOURCE: U.S. Department of Energy

of funds to incorporate fuel cell lift trucks into their fleets. In North America, the approximate ratio of fuel cell powered lift trucks to fuel cell powered cars is about 5:1 and none of those cars are available for commercial sale. Lift trucks have the added benefit of not negotiating the same tricky fueling structure automobiles do; with fuel cell lift trucks, users essentially inherit a gas station with the purchase of every truck. "The operator of the fuel cell also owns the lift truck and the fuel supply," Jensen says. "In the auto industry, they build the car and hope there's a fuel supply available." Part of what makes

lift trucks a more viable outlet for fuel cell technology is that lifts are smaller, carry less daily risk and are not produced in the same quantities as automobiles. Fuel cell trucks have a quicker turnaround in development and easier leverage to wedge itself into the battery market. The result has been a quickly expanding fuel cell lift market being closely scrutinized by the automobile and aviation industries. And what they're scrutinizing are how exactly fuel cells work and how they can be optimized for the mass market.

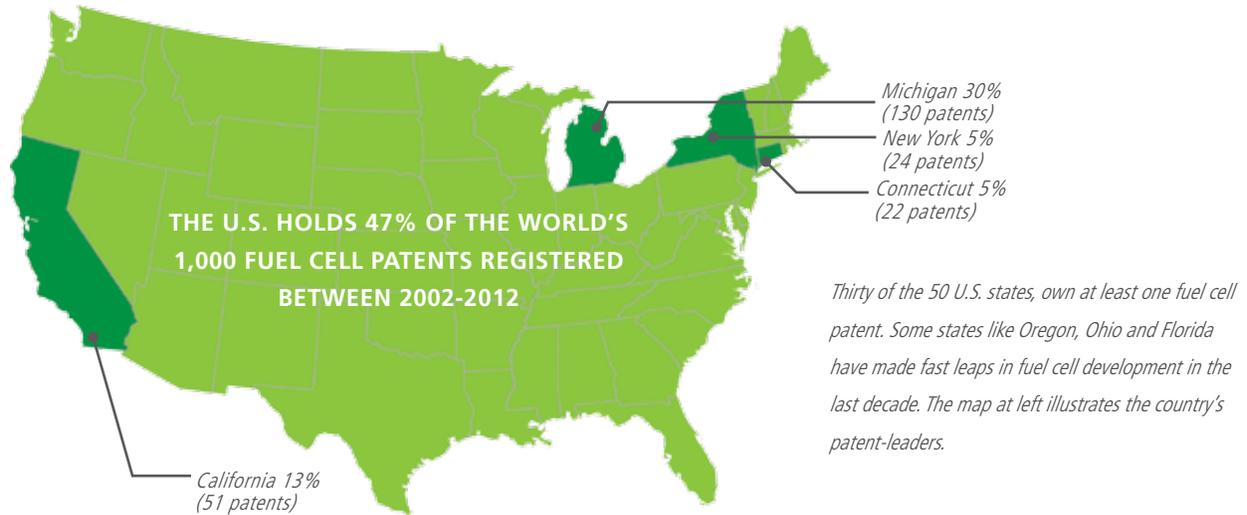
Cell Division

Fuel cells are energy conversion devices (like standard engines) disguised

as energy storage devices (like batteries). Similar to batteries, fuel cells break down two dissimilar metals by mingling them into an electricity conducting liquid. Unlike batteries, which contain limited electricity-creating chemicals within each unit, fuel cells generate their own chemicals and get repurposed through the cell to create an infinite amount of energy. The heat and water fuel cell by-product is broken down into hydrogen and oxygen and converted into more energy.

Among the various fuel cell types, three have emerged as the best suited for the material handling industry: Polymer Oxide (PEMFC), Solid Oxide (SOFC) and Molten-Carbonate (MCFC) fuel cells (See: Fig.1). PEMFCs are being developed by the U.S.

While PEMFC systems have become lighter and smaller as improvements are made, they are still too large and heavy for use in standard vehicles. Warehouses, however, can spare the space.



Department of Energy as the likeliest candidate for transportation applications (both lift truck-type warehouse machinery as well as long distance transportation trucks). SOFC and MCFC fuel cells work best in stationary power generation plants on a scale most similar to the one currently being overseen by the gas turbine in your city's power plant. These latter cells present a unique opportunity for stationary power suppliers like warehouses to develop fuel cell utilization in ways moving objects have yet to achieve: primarily within storage spaces.

FC in the Field

In theory, it would be difficult to make the case for choosing limited energy sources over energy sources that would never need replacing. Efficiencies with facility personnel, lower electric costs, smaller total energy consumption, and almost every bill warehouse owners pay would decrease upon the adoption of fuel cell technology.

Storage space may be setting the pace in the race among fuel cell automobiles, fuel cell lift trucks and fuel cell storage spaces, but it is a minor issue compared to institutionalized support of the technology as a whole.

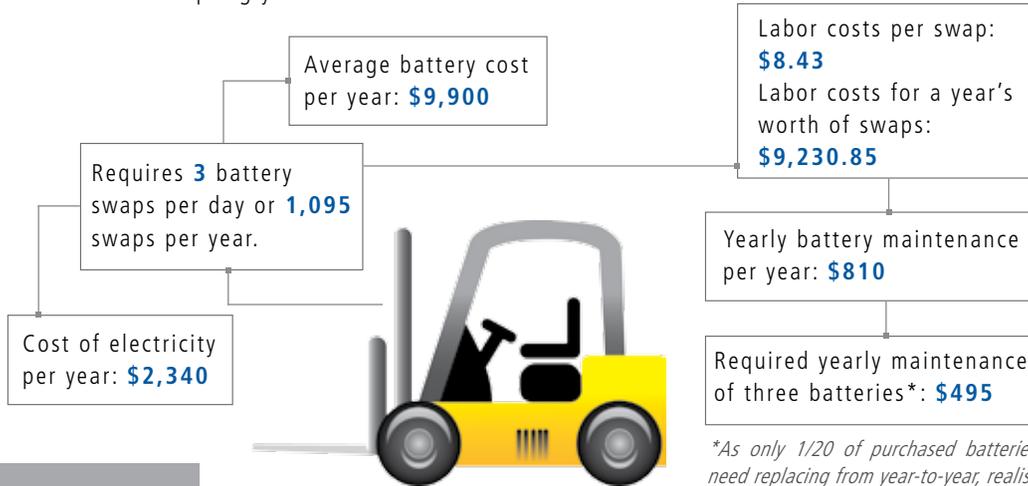
Successfully hooking a new technology into the market is harder than a teen convincing an overprotective father he'll be gentlemanly during a date with his daughter. The difficulty lies not only in giving an underdeveloped technology a voice in a normally bearish market, but in also convincing the market to invest in the technology anyway. To date, fuel cells are still expensive (approximately four times more expensive than a diesel generator's per kilowatt price tag and more than 10 times that of a natural gas turbine's price). Fuel cells are also still less durable than desired (membranes can corrode or degenerate at

high temps), still malfunction in low-humidity and sub-zero temperatures (hydrated membranes freeze in cold storage units), and still struggle with the ever-present problem with infrastructure. It's one thing to want your warehouse operating on fuel cells, it's quite another to spearhead the movement.

Indeed, it takes a great deal of capital investment (and faith) before most of the material handling industry will see increased productivity from fuel cells. It is important to note, however, the many early adopters whom have seen efficiencies rise as operating costs

WHAT DOES IT COST TO KEEP A BATTERY CLASS FORKLIFT RUNNING?

As lift trucks are one of the quickest emerging markets for fuel cell application, let's examine the cost of NOT adapting your fleet.



A forklift truck operating 24 hours a day, 365 days a year.

**As only 1/20 of purchased batteries need replacing from year-to-year, realistically, this number will realistically be either \$3,300 or \$0.*

"Our demand for lifecycle is greater than the auto industry. Our machines will easily clock 20,000 hours before they're retired. A car will typically go 5-6000 hours."

-Eric Jensen, Director of new cell technology research and development for Crown Equipment Corp.

Annual maintenance cost of a traditional battery class forklift: **\$27,276.41**

Fuel cell powered vehicles reduce maintenance costs to approximately: **\$7,600 (66%)**.

- **1.5x** lower maintenance costs
- **8x** lower refueling/recharging labor costs
- **2x** lower net value of total system cost

SOURCE: Robert Leonberger - Barloworld Handling, Gagan Singh - Oorja Protonics, Argonne National Laboratories, U.S. Department of Energy.

fall. Martin Brower, the world's largest restaurant distributor, invested in 15 methanol-powered fuel cells in one of its largest California facilities. With relative immediacy, the company saw its distribution costs decrease after the initial investment.

Direct Methanol fuel cell systems (DMFC) quietly generate efficient electricity without any toxic emissions generated. Highly efficient DMFC power plants require minimal

refueling, resulting in less fuel needed per kilowatt hour of electricity. The result is the potential to effectively lower the total logistical and operational cost of the average warehouse. Foodservice distributor US. Foods invested in 40 of the same methanol fuel cells after a month-long trial period in which the distributor increased productivity from not having to service and maintain battery-powered lift trucks multiple times a day. In 2009, Nissan's Smyrna, Tenn., plant replaced battery pow-



ered forklifts with fuel cell lifts and shaved off 35 daily wasted personnel hours caused by battery maintenance and 1,500 daily kilowatt hours sucked up by the battery chargers.

Fuel Gauge

A single fuel cell produces about 0.7 volts of electricity. Considering it would take at least 58 fuel cells to generate the same wattage as the least incandescent light bulb in your home, it's clear why fuel cells must be combined into stacks and why those stacks eat into the space necessary to store the power supply automobiles. A dozen horses may carry a carriage farther and faster than one horse, but the barn must be a great deal bigger, too. Bipolar plates are used to connect one fuel cell to another and are subjected to both oxidizing and reducing conditions and potentials. This suggests that fuel cell technology in warehouses may



Gualtiero Boffi/Shutterstock

zip ahead of similar vehicle technology because space is less of a concern in the former. While PEMFC systems have become lighter and smaller as improvements are made, they are still too large and heavy for use in standard vehicles. Warehouses, however, can spare the space.

Storage space may be setting the pace in the race between fuel cell automobiles, fuel cell lift trucks and fuel cell storage spaces, but it is a minor issue compared to institutionalized support of the technology as a whole. Technology cannot weave itself into the industrial fabric without support

Many organizations are working to develop consistent, harmonized codes and standards for fuel cells and hydrogen, but they're not here ... yet.

TRANSITION FROM FORKLIFTS TO CARS

Fuel Cells

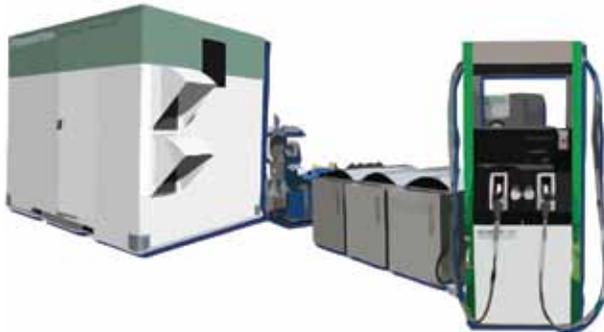


Industrial



Automotive

Hydrogen Refueling Systems



Nissan’s Smyrna, Tenn., plant replaced battery powered forklifts with fuel cell lifts and shaved off 35 daily wasted personnel hours caused by battery maintenance.

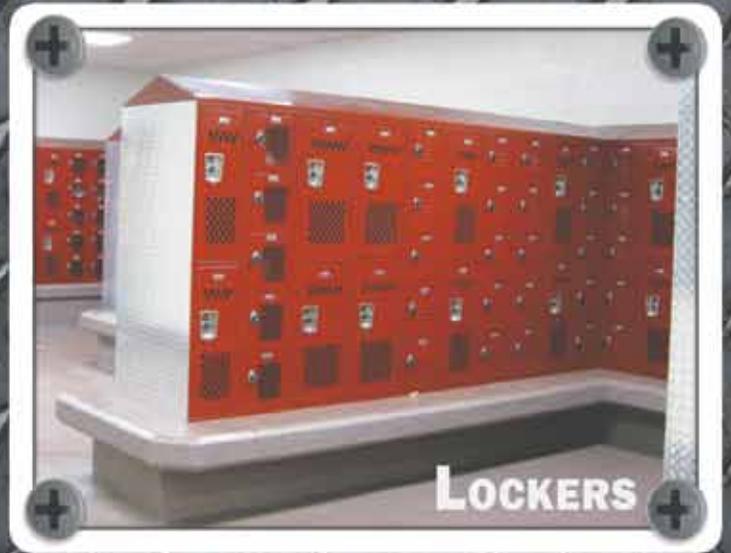
from government and educational institutions. Such recognition would serve not only as a hat tip to investors that fuel cells are a good bet, but also as the pathway to lowering fuel cell production costs. Bob Simon, director of process solutions for GENCO ATC, one of America’s largest third-party logistics companies, said in an April magazine interview that “without programs and incentives, it will be hard to overcome some of the reservations in the industry. Customers are willing to be leaders, but they don’t want to be pioneers.”

Realistically, full adoption of fuel cells into warehouses or storage spaces isn’t practical – and in some cases, impossible. The legislation on fuel cell powered products is almost non-existent, hydrogen is a widely underdeveloped resource for mass consumptive handling and most of the businesses that can afford a large percentage of fuel cell adoption still don’t have organized plans detailing how to implement and maintain it successfully. Many organizations are working to develop consistent, harmonized codes and standards for fuel cells and hydrogen, but they’re not here ... yet. That’s the point; an arrival of fuel cells, although not imminent, is pending. Pioneers are amassing; the shift has taken hold. According to a report filed by the U.S. Department of Energy in 2010, “The National Fire Protection Association published the 2010 code for compressed gases and cryogenic fluid [...] the DOE Hydrogen Program supported workshops that reached more than 300 code officials and published several online courses.”

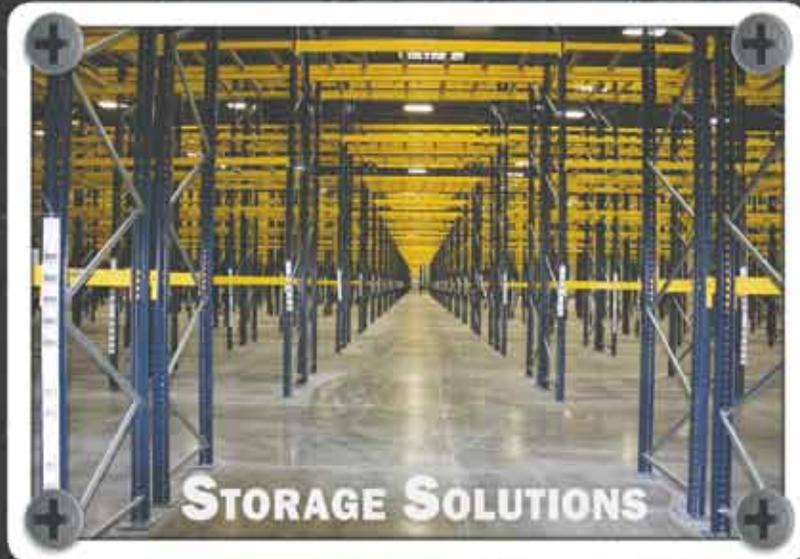
Fuel cells are expensive and offer little incentive for the small markets to invest. And herein lies the problem: in order for costs to go down to a level in which small companies can afford to invest, more companies need to adopt the technology. Lowered costs, however, aren’t likely without more early adopters working out the kinks. Nevertheless, the solutions are nearby; close enough that warehouse owners and manufacturers should already be taking notice, crunching numbers and preparing for alternative fuel sources to fuel alternative operation methods sooner or later. 



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The Dueling Promise of 3-D Printing

Additive manufacturing is quietly looking to break into the material handling industry, leaving those inside it to decide what to do next.

By Adam Shafer



Generations of warehouse owners have dealt with faulty machinery by identifying the malfunctioning piece, contacting its manufacturer to send them a replacement, then waiting while that piece (and many other identical pieces) ships to another closer warehouse. From there, it is delivered individually back to the warehouse owner. Skip ahead a decade or two from now and the manufacturing landscape will almost certainly not function this way. It's a small reality now, as we still live in a mass production-led world, but it won't be long before manufacturing enters a

radio-like transition into full personalization. Those inside the material handling industry have thus far not felt the tug of urgency from additive manufacturing (AM). All signs point to a future in which such manufacturing will play a significantly larger part in the industry's outlook. Until that point, 10-15 years from now, it's up to warehouse owners, logistics businesses and manufacturers to decide how they want to proceed.

By the mid-1980s – in lock step with the development of personal computers and industrial lasers – rapid prototyping



Vladimir Nikitin/Shutterstock

revolutionized manufacturing despite never having produced anything customers would ever see.

The quick and dirty three-dimensional plastic facsimiles of larger, more intricate products served only as disposable models; It was a tactile artist's rendering. If the blitzkrieg of additive manufacturing does end up hitting the industry, the result will not be meek facsimiles of the real thing, but of the products themselves. The concept of 3-D printing is simple: engineer building materials down to their finest powder-like state,

then use liquid binding, laser sintering or photopolymers to fuse the filament layer-by-layer into a software-designed three-dimensional object (fig. 1).

Trajectory

If the concept is simple, the ramifications across multiple industries are not. Additive manufacturing is, by most estimates, at least a decade or two away from rebooting the industry completely – which is either an optimistic look or a pessimistic one depending on what side of the technology you're on. Those bullish on additive manu-

facturing believe it will be deployed in tandem with mass production and used to build geometrically complex, personalized, multi-material pieces on a significantly smaller scale. Already AM has a market presence as corporations like Siemens and Boeing use the technologies for the manufacture or laser sintered hearing aid shells, molds for clear braces and replacement parts for F-18 jets. It is a limited list, but like large paws on a puppy, it's a harbinger for how big this beast can get. AM produces mostly prototypes or add-on parts, but it is only a matter of time before the process will be able to produce the entire part.

The trajectory of 3-D printing suggests that the manufacturing process will eventually create replacement parts for weapon systems, marine products and land and air vehicles. From there, not only will new products be made that were previously thought to be impractical because of risk or manufacturability, but also new methods of production and dissemination will be made available, too. Many companies will discover that additive manufacturing can serve as a strategic bridge between a finished design and production tooling, allowing them to deliver products to customers quicker than before. Until the cost-per-unit – and in many cases, the speed with which these pieces are manufactured – can compete regularly with mass production, there is little risk of rapid manufacturing eclipsing traditional methods. Still, discounting the new development because customers cannot yet buy it at Wal-Mart is like ignoring the tornado until it gets closer to the house.



An example of the software input necessary for advanced additive manufacturing.

Kinko's was making copies and printing pages on the University of Southern California campus 25 years before it became the leading retail copier, merged with FedEx, and changed business presentation capabilities forever. Personal computers existed in the 1940s but weren't common in the average home until 1982 and then weren't the backbone of commerce until a generation after that. In these cases, the businesses willing to assimilate these empowering technologies thrived. Those that kept them at arms length did not.

Terry Wohlers, whose research firm specializes in AM growth, predicts that 30 percent of all items printed in three dimensions will be used as final products by 2020 – quadruple the percentage produced in 2010. By the time today's newborns reach fifth grade, 3-D printing will be a \$5.2 billion-per-year technology. Industry leaders like John Braun of Alchemy Models Incorporated believe the eventual endpoint for additive manufacturing will involve building with natural materials that have thus far been unusable. As part of a response to a presentation given to a



symposium of experts in 2008, Braun called to mind the construction of a space station on the moon using the surface's dust particles sintered together. For the cost of a manned flight to the moon, a 3-D printer and some snacks, Braun posits that manufacturing could begin without the hefty cost of transporting building materials. The reality of such an endeavor remains largely in the imagination of a distinct minority, but scaling the idea down to a more regional level in the next couple decades will raise fewer eyebrows. Imagine rebuilding in impoverished nations like Haiti or Rwanda if additive manufacturing could transform sand and dust into buildable filaments like they've begun doing with glass, plastics and certain metals. Now imagine

After each layer, the piston below the build chamber lowers the powder bed, preparing for the next layer.

The cycle continues until the model is complete.

When finished, the model is suspended in powder to cure. At the end of curing time, the machine automatically vacuums most of the powder from around the model and recycles it for use in subsequent builds.



the adaptation construction, storage and transportation companies would have to go through if their shipping materials were already on-site?

The most historically successful way to proceed at the precipice of shifting trends for manufacturers, freight companies and storage providers has been to absorb it into their business model or plan to compete beside it. The question for freight companies, who primarily handle each step within the supply chain, are what to do when raw materials and polished parts are no longer transported, but downloaded. What will be held inside storage warehouses when mass production is no longer necessary? And, what do manufacturers make if the consumers make their own products? The printers and the filament used for additive manufacturing would still be

“By the time today’s newborns reach fifth grade, 3-D printing will be a \$5.2 billion-per-year technology.”

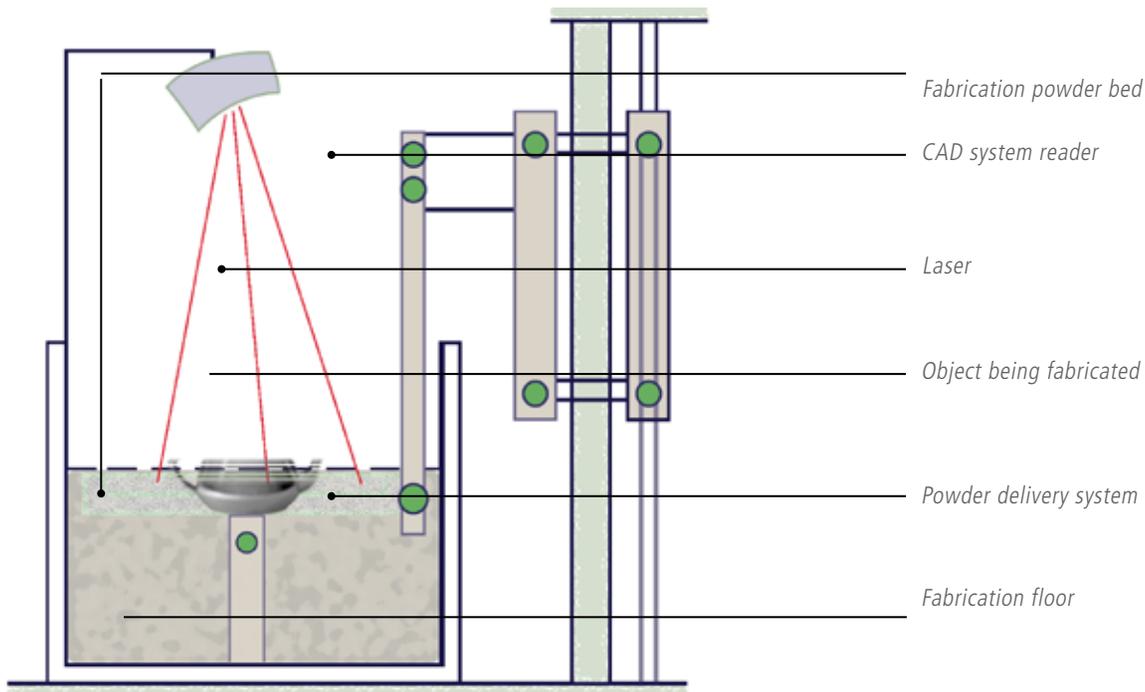
~ Terry Wohlers

packaged and shipped globally, but differences between shipping boxes of metal filament and billets of raw material are as evident as the differences between a quart of milk and the cow it came from.

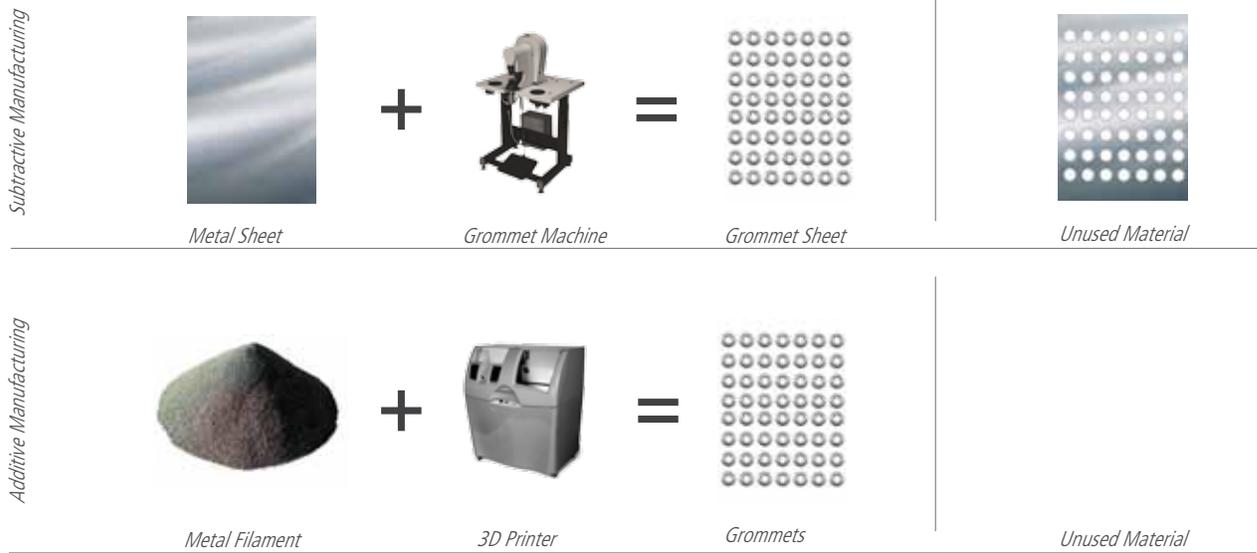
Quality Goes Up, Cost Goes Down

Accessibility and personalization of products have been the two most highly leveraged attributes of additive manufacturing in the technology’s early stages. Forcing mass production to give a little elbow room to personal manufacturing for the first time in more

than a century will ultimately make 3D printing a known commodity around the world. That development is merely a whisper now, but there is a growing crescendo of certainty that includes the ability to put the tools in immediate proximity to the customer instead of distant manufacturing facilities. Also included is the belief that AM development would increase fuel and carbon emission efficiency due to lighter parts and create a more efficient use of raw materials and manufacturing processes. Most machines are designed for speed and for specific part sizes. To achieve the



A SIMPLE MATHEMATICAL EQUATION



ADDITIVE MANUFACTURING VS. SUBTRACTIVE MANUFACTURING

Additive manufacturing's product formation also provides a threat to subtractive manufacturing. Current products, designed to be machined and molded from solid billets, use excessive material and often force a majority of the metal to be cut away in order to form the piece. No part of that cut away material can be reused until it is repurposed at a later date. 3-D printers fuse together only the material powder necessary to create the object – or about 10 percent of what it would take for a machine to manufacture the same part. Any filament powder remaining can be reused immediately.

first two, each part usually gets saddled with additional materials necessary for the machine to function. Without the constraints of bulky machine parts, additive manufacturing is able to design a lighter product with fewer redundant materials. Printers can also build 24 hours a day while being left unattended and are capable of producing smaller metal components in a matter of hours or days as compared to the traditional days or weeks it usually takes to produce similar sized

metal parts. The concept of building an additive manufacturing machine is in early stages of development, but could provide manufacturers and storage owners huge incentives down the line if retooling each machine remains easy in the face of new growth.

The Difference Between Awareness and Trust

The industry's lethargic attitude toward innovation investments is also what threat-

ens the profitability of each business. For the next 10-20 years, the construction, manufacturing, logistics and storage industries will all find themselves in a game of chicken with each other determining whether to embrace change and innovation or resist both and risk being massively behind the times. Behrokh Khoshnevis, an engineering professor at the University of Southern California, remarked on the fragmented nature of the construction industry as being affected primarily by its use of primitive machinery.

“Companies face fierce competition to survive because they lack economically viable alternatives, and building code compliance allows little room for experimentation or innovation in construction technologies.”

~Behrokh Khoshnevis

“The low cost and the low degree of sophistication of such tools allow any small company to engage in construction activities,” Khoshnevis said. “Companies face fierce competition to survive because they lack economically viable alternatives, and building code compliance allows little room for experimentation or innovation in construction technologies.”

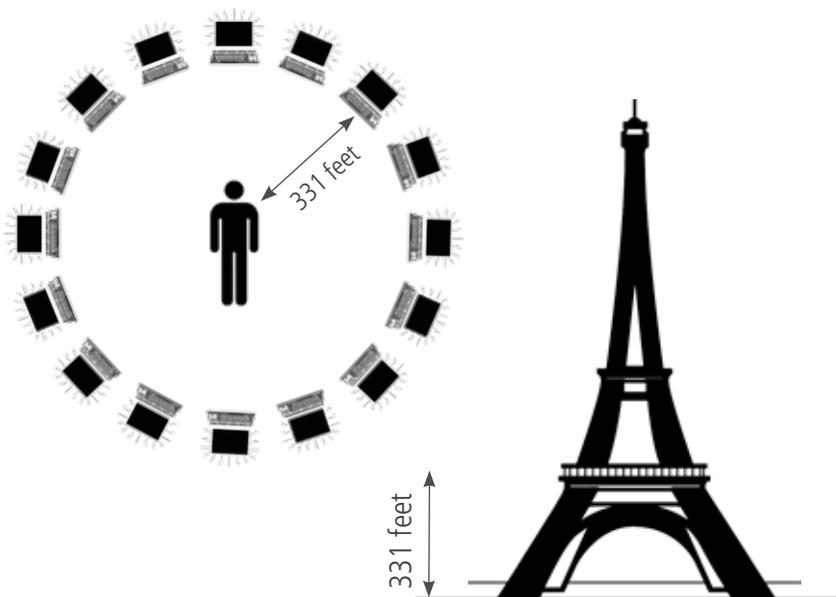
Additive manufacturing technologies, in theory, would allow wiggle room both economically and physically. Without the need for production tooling, the flexibility and reconfigurability of any given system means that the same machine can be used for the manufacturing of different components of the same piece instead of one piece per machine. This opens up the potential for localized production, especially in low volumes. With increases in

speed and lower cost systems and materials, it is possible 3-D printing would bring manufacturing back to high-wage economies, especially in the interim when additive manufacturing is still mostly owned by the material handling industry, before private persons take manufacturing into their own hands.

Just a Fad

The inability to guarantee material properties for any given process is perhaps additive manufacturing’s biggest roadblock going forward. AM products have been refined only to the point that they closely resemble mass-produced bolt-and-weld productions. Ultimately, however, they don’t usually meet the mechanical properties required to comply with specific structural needs. Would you board a cross-country flight on a plane constructed of parts only closely resembling those of other planes? Not likely.

THE DISTANCE BETWEEN YOU AND A COMPUTER



Additive manufacturing is still fairly young. It took nearly 40 years for computers to become commonplace and now they are prominent in our lives. How prominent?

There are 3.8 million square miles in the U.S. and 300 million existing computers. The farthest a person could get from a computer today is only 331 feet.

To put that into perspective. It’s about the distance from homeplate at Dodger Stadium to right field foul pole.



Gilles Lougassi/Shutterstock

Rex Brown, principal engineer for Honeywell, said in 2009 that he believes rapid manufacturing's best usage will fall short of competing with manufacturing processes demanding strict build requirements. There is still a long way to go before the masses are convinced of the technological capabilities of 3D printing. Not only will such processes require massive testing and provability, but convenience will have to come into play. Few would label today's material handling environment convenient in the larger context; massive machines in empty storage spaces spread out over great distances is the norm and will continue being the

norm until additive manufacturing or some other innovative technology can compress and articulate CAD transfers in the average on-site facility or business office. The compression necessity and security involved in the wireless transfer of CAD drawings to database drawing machines just isn't where it needs to be. Even if it were, it is less likely that CAD programs will become user-friendly enough for the average person to utilize it with the ease of a personal printer, for example.

The cost of these machines is another obstacle separating the material handling industry from additive manufac-

turing, especially when considering the limited capability those expensive machines possess. The prices of the machines capable of printing even passable industrial objects (they range from \$8,000 to well over \$500,000) are expensive enough to limit most educational facilities from adopting the technology – an important step in any technological advancement. There are some machines that cost only a couple hundred dollars, but the capabilities of those machines are limited to primarily plastic molds of small objects. Much like personal printers, 3-D printers aren't nearly as expensive over its lifetime as the ink they use. The ink, in this case, is the limited array of powder filaments. Stainless steel, glass, silver and a variety of plastics are available, but until the materials expand, additive manufacturing won't touch mass produc-

By the time today's newborns reach fifth grade, 3-D printing will be a \$5.2 billion-per-year technology.

tion. It would be like asking people to print documents without using black or blue ink.

Speed is always an issue. Dr. Neil Hopkinson heads a team from Loughborough University in the United Kingdom that has invented a method of additive printing that uses infrared absorbing filament and infrared heating to fuse each layer of filament together. With this process, his team is able to produce 1,000 small plastic pieces (such as snowboard buckles) in each production run. Hopkinson also predicts this number will increase by 10 or even 100 in the next five years. Richard Hague, Hopkinson's colleague at Loughborough, sees integration – not speed – as the technology's ultimate challenge. "Regardless of how reconfigurable and flexible an additive manufacturing supply chain may be," Hague wrote in a 2009 white paper on the subject, "the AM component will still have to sit somewhere within a conventional business configuration." The belief in this instance being that possessing the tools is not enough, possessing the ability to use them is equally important. This is the beam of hope the brightest minds of the material handling industry would do well to focus on going forward.

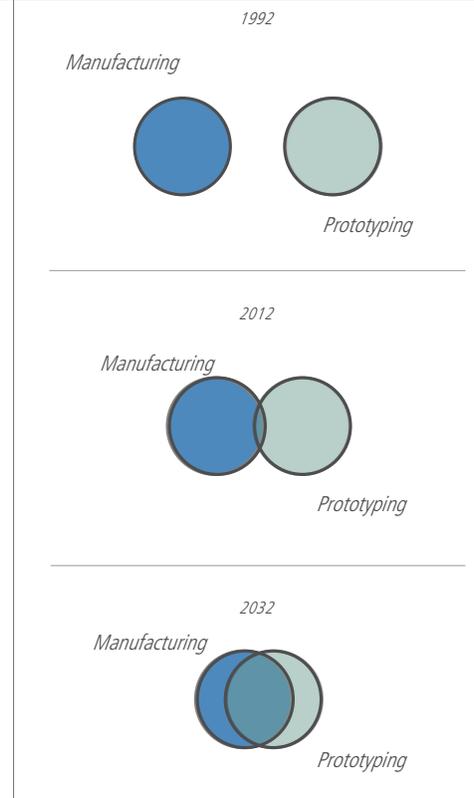
Assuming the printers adapt to the time demands a mass producing world has made commonplace – and in some sectors, like small furniture and light clothing, it already has – manufacturing plants and storage facilities can still offer something these printers never will: the production expertise and backlog of product to provide end-users their goods

in a quicker and more assured pace. Establishing solutions and adopting additive manufacturing early will go a long way in staving off the threat, as would the opportunity for production companies or storage facilities to incorporate additive manufacturing into the maintenance of their products. Perhaps a portion of a corporation's warranty may include the necessary design software to print replacement parts, with localized technicians to assist with the application. Even after the technology is available, customers will still want and need assistance applying it to their lives.

One Piece at a Time

Ultimately, if manufacturing and storage are going to adapt to customizable 3D printing, their rules are going to have to change. If mass production loses ground to AM processes, customer service will play a larger role in material handling. Globalized commerce, in turn, will bear ample fruit in some sectors and dry to dust in others. Shipping will be replaced by downloading and physical storage will give way to cloud-based storage online. Businesses open to adapting to these changes can thrive. The quicker storage facilities adapt cloud storage options into their normal capabilities, the more attractive a turn-key service they will be able to offer. Such is the case with logistics companies; shipments of large heavy quantities will always be necessary, just not as commonplace. What will be necessary is the addition of smaller, more microcosmic logistical operations traveling shorter distances and offering more personalized solutions to end users. A logistics company might lose some of its necessity amid a decline in freight ship-

ADDITIVE MANUFACTURING: Then & Now



ments, but the opportunity to organize, transfer and stow will, in some capacity, almost certainly remain intact. No matter the technology, people still exist and those people still require materials that make their lives function. What 3-D printing offers is a change in method, not need. Businesses bogged down by the idea that their clients no longer need their services will disappear.

Eventually, additive manufacturing will find a footing within production industries. The trick for storage facility owners, manufacturers and anyone within the logistics industry will be to figure out a way to integrate 3-D printing into their business before it becomes a threat. 



The Clouds Roll in

Despite the debate among warehouse owners over the merits of third-party software management, cloud computing remains poised to take the industry by storm.

by David Batka

While cloud computing has received growing exposure in the last several years, its relevance to the materials handling industry has vaulted over other trends to become huge on a scale comparable to the arrival of the World Wide Web. But, despite the fodder, many still are confused about what cloud (or “third-party”) computing actually is. When a third party, such as Google, MapQuest or

Amazon, hosts an Internet service and those parties allow customers access to it online, that access to the shared space is known as a cloud. Clouds allow for reduced hard drive space on personal computers and instant access to countless programs. The implementation of third-party computing in the material handling industry has developed in the form of warehouse management software.

Cloud computing allows for reduced hard drive space on personal computers and instant access to countless programs. The implementation of third-party computing in the material handling industry has developed in the form of warehouse management software.

Outsource IT

The pros and cons of cloud computing are still at a unique balance. Clouds offer clients lower operating costs and increased availability of programs that may have been previously too costly. By outsourcing the program and its storage, IT costs, and the cost to store and run the programs in-house, are drastically decreased. This can be beneficial to both small companies and larger Fortune 500 ones because fixed hardware solutions would be eliminated, and IT resources would be allocated towards other av-

enues. Cloud networks are also advantageous to those small companies who can't afford an IT team or those whose IT departments are overloaded. Companies like Rack Space offer servers featuring Linux and Windows through the cloud for as little as 1.5 cents per hour.

Before cloud computing, if users wanted access to a program or application, they would have to purchase it along with its licensing. This process became more complicated when that program or application was networked through an of-

With third-party computing, all actions are performed through the Internet on the host's website and then saved to the third-party's massive hard drive, rather than the user's personal computer memory. This is beneficial because the data can be accessed from any Internet compatible device like laptops, desktops, smart phones or tablets. This makes the office truly mobile, allowing colleagues – in other states or away on business – immediate access to any shared file.

Given the small memory of tablets and smart phones, cloud computing is ideal for field work when only cellular data service is available.



Goodluz/Shutterstock

Clouds offer clients lower operating costs and increased availability of programs that may have been previously too costly.



Fenton one/Shutterstock

office or an entire company. To license 50 desktops loaded with Microsoft Office, it would have cost a business roughly \$18,000. While the licensing cost is comparable with third-party computing, programs within the cloud are on-demand. Businesses receive all the updates and latest versions of the program for free because they are on a subscription basis, or they can choose a scaled version of the application or software, lowering costs dramatically. This subscription basis cuts down on future upgrades and IT costs because an IT department doesn't need to install the new firmware updates; the host of the program performs all troubleshooting and upgrading.

Dark Horizons

There are also serious risks customers will need to weigh before adopting third-party computing into their business. The lack of privacy remains the biggest deterrent for customers weighing the pros and cons of cloud computing. A client no longer has direct physical access to the hardware on which their programs or data are stored. Since the programs are hosted through a third party, the connection is thus bridged through a server. So, if the software or server malfunctions, the third party host troubleshoots the problem rather than the client's IT personnel. The time delay could possibly be significant and, in turn, cost money. The question of data ownership within the

cloud remains a largely unchallenged sticking point. Many companies (and cloud owners) have vague or undetermined policies regarding ownership. If a client does not have direct access, the argument has been made that they also do not have the rights to it either. If a subscription isn't paid, service can be terminated. For companies that operate their entire business through third-party computing, this could be crippling. If cloud storage is outsourced to private companies overseas, public domain material may no longer be free, as some users may not subscribe to the particular company's service – the company now has control of that specific information hosted in its storage space. Subscribers

MILESTONES IN THE EVOLUTION OF CLOUD COMPUTING

1960s

Computer scientist John McCarthy theorizes computing used in a shared public manner

1982

Internet Provider Security is standardized

1990s

Grid computing emerges

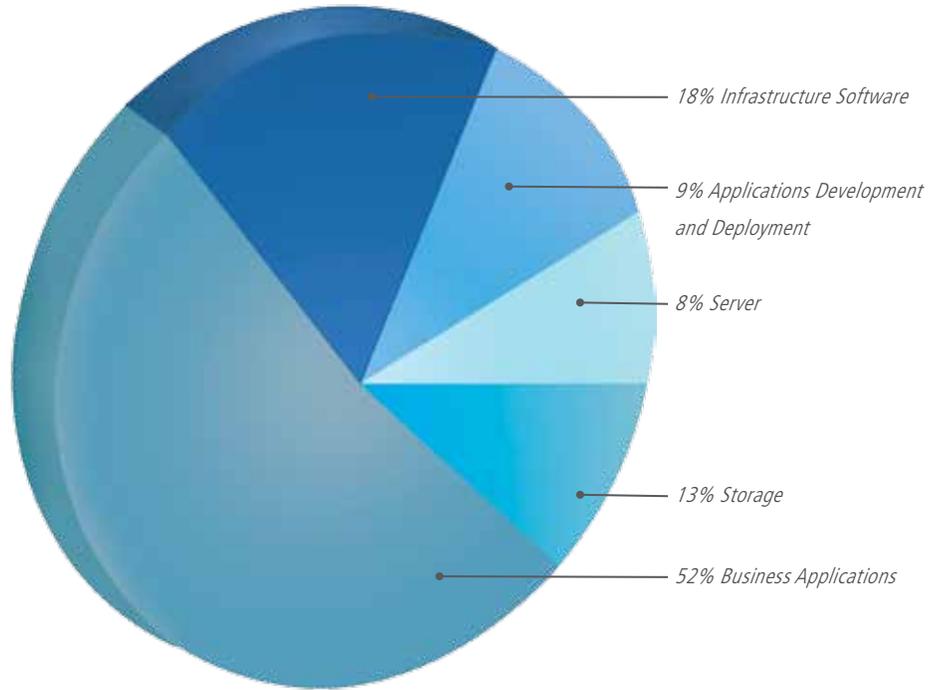
1999

Salesforce.com introduces first online website application

need to read the fine print before engaging in any form of third-party computing. Some services have written policies stating that they will use the data stored on their servers however they please. Other services will charge a fee to transfer subscriber data to another company, the same way a bank might charge an ATM user a fee for pulling money from an account that does not belong to that machine's bank. A user of cloud services is likely to accumulate and use more data storage the longer they remain a subscriber. Today, to transfer 30GB of data at \$10 per GB may seem reasonable. But, in 10 years, when a database has grown to one terabyte, paying \$10,000 for one's own information seems rather absurd when that data could have been permanently stored in-house for far less.

With home use, Internet service provider's bandwidth caps also need to be taken into consideration. ISPs are increasingly capping monthly data usage or slowing bandwidths when they become exceedingly high. Having to constantly stream data back and forth between the cloud, this cap potentially may be met easily. If this occurs, Internet connection speed could be throttled

HOW CLOUD COMPUTING WILL BE USED IN THE NEXT FIVE YEARS



IDC Market Intelligence Firm

back, and access to the information might not be as easily accessible as if servers were saved to an in-house hard drive. Certain companies charge for going over a set bandwidth, and these extra charges need to be taken into consideration when deciding to use cloud services, especially if mobile cloud com-

puting is the primary vehicle. Companies can charge as much as a dollar for every gigabyte used past one's predetermined limit, which for heavy home Internet users, these overages can become quite costly, given that streaming a standard definition video consumes roughly half a gigabyte.

2002

Amazon Web services launches

2006

Google launches Google Docs

2008

Eucalyptus as the first open source advanced wireless service application programming interface for private clouds

2009

Microsoft enters cloud computing with Azure

Cloud computing makes warehouse operations undeniably easier, but security remains an issue with many companies contemplating the cloud.



EMERGING WAREHOUSE TRENDS

Small and mid-sized companies are purchasing WMS at a greater frequency than their larger counterparts, according to Chicago Consulting. This move towards investing in warehouse management software by small and mid-sized companies is believed to have been spurred by the slow resurrection of the U.S. economy. The consulting firm also noted that larger companies are likely to follow within six to 12 months.

Smaller operations outgrowing their current management system are looking to upgrade, and many are doing so through cloud computing with their WMS. This option lets them avoid the cost of IT, while still staying competitive with much larger businesses. A trend also with companies using WMS is a closer scrutiny of their labor management to increase their warehouse efficiency. Many more companies are allowing operators to govern workers more for increased productivity.

Information theft hangs like a cloud over companies considering adoption of such technology and illustrates that no infrastructure is entirely threat-proof. IBM researcher Scott Lunsford proved this when he hacked his way into a nuclear power station, which the plant's owners claimed was not only improbable but virtually impossible. "It turned out to be one of the easiest penetration tests I'd ever done," Lunsford told reporters. "By the first day, we had penetrated the network. Within a week, we were controlling a nuclear power plant. I thought, 'Gosh. This is a big problem.'"

The truly frightening aspect of what Lunsford and his team had done was expose the relative ease with which important information can be accessed and warped when stored externally. The nuclear plant was powered by Supervisory Control and Data Acquisition software (SCADA), which controls infrastructures throughout the U.S., such as water distribution systems, oil pipelines and even subways. French securities team VUPEN did a similar move when they discovered a way to exploit Google's Chrome browser. The U.S. Federal Bureau of Engraving and Printing's cloud was hacked in early 2010 with programming that costs under \$1,000 (€733), affecting the Bureau's four websites and causing them to shut down for

With the notion of complete accessibility to data from virtually anywhere and with the spread of Internet accessibility in remote areas, there seems to be a silver lining for the future of cloud computing.

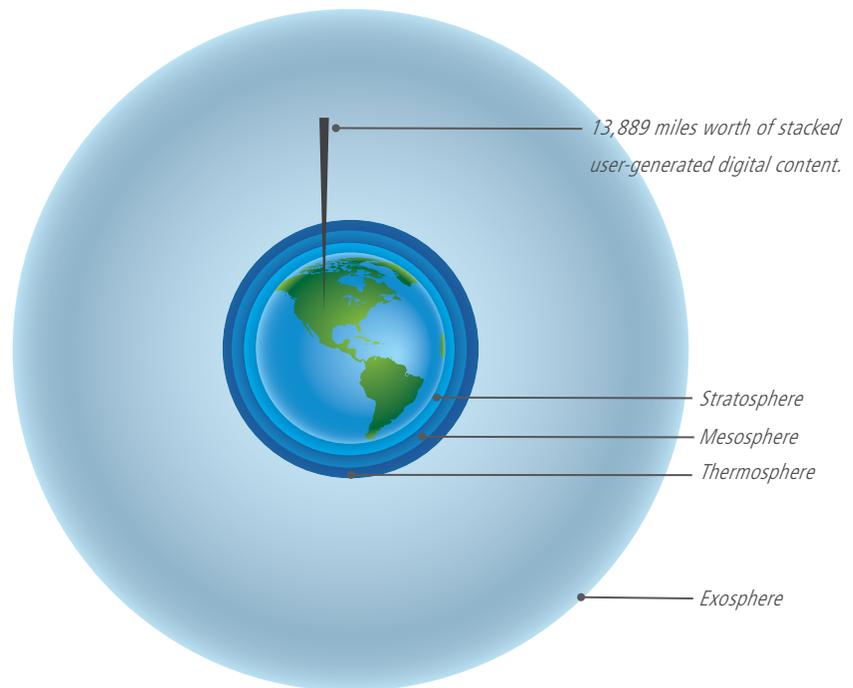
several days. "I am not going to say this will scare users away from cloud computing," says Thomas Krafft, director of marketing at database management solutions company, Objectivity Inc., "but it definitely brings into clear focus the issues surrounding security in the cloud."

When Amazon Web Service had an abrupt outage in April 2011, Netflix, whose service is hosted on Amazon's Elastic Compute Cloud (EC2), weathered the storm and stayed functional. Cleverly, their system was constructed with integrated redundancy and has its infrastructure distributed broadly and backed with components like fallback and stateless service, safeguarding the site against catastrophe. While Netflix has deep pockets, companies considering implementing cloud solutions should still take a lesson here and implement their own IT security defenses by installing programs that break up data and monitor cloud traffic.

Alternative Solutions

For those apprehensive about diving head-first into third party computing and moving all their data out of house, there are still options that allow scaled universal accessibility. Software as a Service (SaaS) allows users access to a specific program via the Web, but their entire system is not web-based. For example, a subscription to a word processing program could be acquired, so work can be done anywhere through an Internet connection. But a document like a spreadsheet, for example, can be stored in-house, still only accessible from a single computer or server. This form of use is also ideal for a company to promote their program, considering they

BYTE SIZED



70 percent of the digital universe (880 exabytes/880 billion gigabytes) is generated by users.

If all the world's digital information were loaded onto 1-inch-thick, 1 terabyte external hard drives and stacked skyward, it would extend over 13,889 miles (22,352 km).

Imagine if our biggest cloud enterprises like Google and Facebook suddenly hit the "off" button.

Source: www.srh.noaa.gov; www.emc.com; www.amazon.com

can offer a free trial version for a period of time, allowing users to see the added benefits of SaaS before purchasing. EWON is a Belgium-based business that connects and synchronizes industrial machinery using the Internet. "As soon as your web browser is up, you can use [a SaaS]," Francis Vander Ghinst, the company's sales manager in Brussels says. "The footprint is zero, so you don't have to

manage physical hardware. You can use it anywhere."

Similarly, Interlake Mecalux offers a subset version of its EasyWMS, EasyWMS Autoinstall as a SaaS, which is a lightweight product for small and medium warehouses managed by paper or radio frequency. This would allow multiple warehouses to have a centralized point of connectivity and data

storage, which gives the client the ability to access data from multiple warehouses, rather than simply the warehouse they are in. The increased efficiency and lowered time for logistical coordination offers unprecedented savings to warehouse management systems. This service allows a warehouse manager to know the quantity and location of a given product in another warehouse thousands of miles away, decreasing a possible glitch in communication. Further benefits of utilizing EasyWMS is the ability to scale the program to best suit individual warehouse needs without losing the option of scalable growth. SaaS offers aspects of the cloud that are very beneficial, such as on-demand access to programs or storage; though, it will not fully replace in-house storage. Rather, SaaS functions are ideal for those who want to access only a specific program from anywhere.

Forecasting Clouds

In Gartner's report, "Significant Benefits Realized with Supply Chain Management in the Cloud," he states, "the advantages of cloud computing seem to far outweigh the negatives in most consumers' minds." The report also concluded that out of 130 companies surveyed, 124 of



them were using or considering cloud computing, citing the enticing prospect of reduced overhead and customizable storage space as the main compulsion for their interest in third-party computing. IDC estimates the cloud computing market take in \$55 billion worldwide by 2014. Companies ranging from the retail industry and the high-tech sector to manufacturing are embracing this new form of communication. This shift in the weather towards third-party computing has grown out of companies' needs to

handle their ever-growing amount of information and desire to find a streamlined avenue to access data and applications cost-effectively. Its low-cost advantage gives organizations the agility to scale their needs quickly through top-tier infrastructures. Though, if warehouse owners are struggling with moving their entire operation to a third-party, they could still utilize an outsourced server for backup purposes.

It remains debatable whether third-party computing will entirely eliminate other in-house data storage. Security levels for clouds need to be tightened, dead bolted and triple-checked. With the notion of complete accessibility to data from virtually anywhere and with the spread of Internet accessibility in remote areas, there seems to be a silver lining for the future of cloud computing. 

For those apprehensive about diving head-first into third party computing there are still options that allow scaled universal accessibility. Software as a Service (SaaS) allows users access to a specific program via the web.



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Smarter Warehouses Save Energy and Money

Energy savings strategies used in automated storage mean lower electric bills.

by Marta Jiménez-Lutter

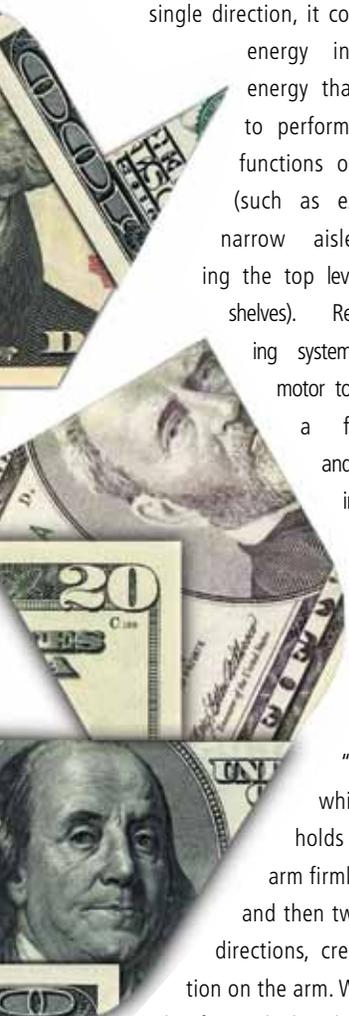


The material handling industry is finding an increasing amount of technologies applicable to creating a more useful, efficient warehouse environment. Automatic warehouses save energy in many ways; from efficient, lighter engines in the AS/RS systems, intelligent motion calculations and regenerative power supplies to the simplest of all energy savings method: turning off the lights.

The Healing Power of Regenerative Braking

The principles of physics assert that energy is neither created nor destroyed

– it is transformed. When an automated machine is in motion, the kinetic energy created from this movement must go somewhere when the machine slows down. When a stacker crane stops, its kinetic energy is turned into heat. In a non-regenerative braking system, that heat dissipates and is lost. Regenerative braking – a still infant technology only recently being absorbed by the material handling industry – recaptures this energy and uses it to power up other machines within the same warehouse. When an electrical motor, like the types propelling AS/RS, runs in a



single direction, it converts electrical energy into mechanical energy that can be used to perform the necessary functions of that machine (such as extending down narrow aisles or reaching the top level of high height shelves). Regenerative braking systems engineer the motor to operate in both a forward motion and then switching to a reverse, effectively creating heat similar to that of the child's prank known as a "mercy burn," in which one person holds another's forearm firmly in both hands, and then twists in opposite directions, creating heat friction on the arm. With AS/RS units, this forward, then backward motion allows the motor to also switch from an electricity converter to an electricity generator by redirecting the mechanical energy back into electricity. In order for the motor to reverse rotation and generate electricity, the vehicle's momentum must be the mechanical energy used to throw the motor in reverse.

This is trickier in AS/RS systems than within motor vehicles, as the start and stop times for an AS/RS unit are extremely brief as compared to the coasting time of a car on a highway. Still, the energy necessary to power an AS/RS unit is much lower than a

The Mecalux Galileo software enables the system to organize the stacker crane's motions. This allows the timing of the ascent and descent, making a crane use the least amount of energy.

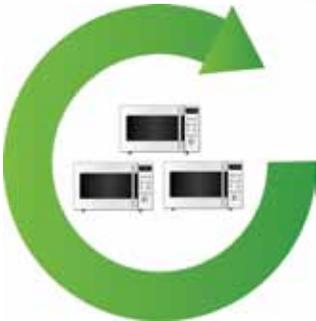
car. What results from harnessing each little flush of heat given off by an AS/RS brake is a partially self-sustaining system that uses the machine's momentum to create energy, which is then fed back into the system from an outside power source.

Control Software, Control Energy

Regenerative braking doesn't just conserve energy in a single automated unit either. If organized properly in a fully functional automated cold storage warehouse, the heat given off in

the automated units would normally destabilize the temperature in a freezer space, which would, in turn, cost more money to restabilize. Regenerative braking also conserves energy across multiple units. Facilities with more than one stacker crane use the energy generated by one machine to power the others. The energy recuperated returns to the plant grid and it is used to power lights, heat and cooling systems and to operate the stacker cranes. Control software, such as the Mecalux Group's Galileo, enables the

THE MICROWAVE EQUIVALENCY



*The energy to start a stacker crane:
75 kW = 107 microwaves*

*The energy to keep it running:
2.1 kW = 3 microwaves*

INSET: A single mast stacker crane lies horizontally on the installation site, awaiting vertical alignment (below).



system to organize the stacker crane's motions. This times and coordinates the ascent and descent of the crane, making it use the least amount of energy, and the descent of one machine powers the ascent or startup of another.

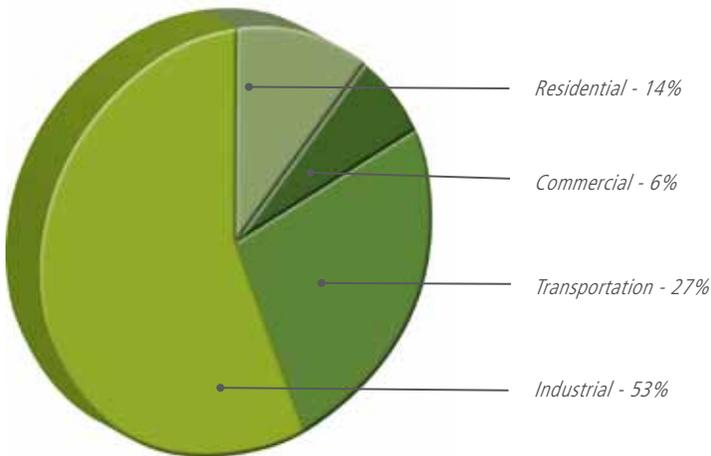
In a big installation with several machines, Galileo ensures that each stacker crane starts at a different time than the other stacker cranes. Mecalux's Hayat installation in Turkey is a good example of how this system works. With the warehouse's total elevation near 140 feet, its stacker cranes move two pallets at the same time, so they carry large amounts of weight. The energy needed to move these heavy loads so high can be costly. Mecalux found a way to maximize the efficiency of the installation. "Regeneration in these circumstances is very advantageous because what goes up must come down," Luis Escobedo, ro-

botics innovation director for Mecalux Spain said, "and everything that goes down regenerates a percentage of energy. If the expense of going up is 100 percent and we regenerate 60 percent going down, it only cost us 40 percent to go up and down."

The Mecalux Group's software also sets a control system that continuously calculates the time required for each machine to get to any position. To save the most amount of energy possible, the software tries to make one crane's descent coincide with the acceleration of another, ultimately reducing consumption. Starting a machine is the most costly expulsion of energy a stacker crane performs. Galileo software anticipates when each of the 15 cranes in the Hayat installation need to move, starts them individually and utilizes the power generated by one to assist the next; continuing through the cycle of 15 and repeating. Firing up all



WORLD ENERGY CONSUMPTION BY END USER SECTOR



Source: www.srh.noaa.gov; www.emc.com; www.amazon.com

15 machines at once would almost require the warehouse to have its own nuclear plant.

Heavy Metal

Due to the height of the Hayat installation, and the weight of the loads transported, the size of the crane's engines was maximized to increase their efficiency. Mecalux wanted the motors to be big; the bigger the motor the higher efficiency that can be achieved. They generate more energy and are able to save more energy as well, making up for the higher sticker price, which is usually 5 to 15 percent higher than regular engines

Another way to save energy is to remove weight from the engine instead of installing a larger one to the AS/RS. Escobedo explained that reducing the weight of the stacker cranes from 31 tons to 26, required less energy for the motor to start. Starting the machine uses more energy than moving it once it is running "When the motor

starts, it spends 75 kW, as much as approximately 90 microwaves working at full power. Once the machine is running, it only needs 2 kW, the equivalent of just three microwaves working at full power."

Light Saver

Escobedo added that innovative engineering isn't always necessary to conserve hefty amounts of energy in a warehouse. "If you want to reduce your energy bill, turn off the lights." Darkening warehouse space is probably the easiest, most efficient way to save money and energy in an automatic warehouse. In a conventional warehouse, personnel with forklifts pick the pallets from the shelves, so the area needs to be illuminated. When the warehouse is 50 feet high and the lights are on the ceiling, very powerful lamps are needed to illuminate the area, roughly 700 watts per 107 square feet. In a fully automated warehouse, no light is needed, since the stacker cranes can function with-

Smarter machines, integrative software, lighter motors and advanced lighting are several of the ways an automatic warehouse conserves energy, money and the environment while enhancing the productivity of storage spaces.

out it. There is usually an emergency light; though, it is rarely on. This adjustment alone can make the biggest impact in the client's electric bill.

In the case of lighting, the introduction of LED lamps for industrial settings has further led to increased savings, since LEDs consume about a third of the energy of regular lights. These lamps also have a quick start, as compared to their incandescent counterparts, which can take up to seven minutes to fully illuminate.

Smarter machines, integrative software, lighter motors and advanced lighting are several of the ways an automatic warehouses conserve energy, money and the environment while enhancing the productivity of storage spaces. Mecalux is constantly improving its software package, motors and machinery design to meet the demands of its clients and maximize the effectiveness of its machines. 

Fire Works

Matching the right storage facility with the right fire prevention system can make the difference between scorch and soot.

by *Marta Jiménez-Lutter*

A well-designed, fully functioning and properly installed sprinkler system is the most important fire protection a warehouse can have. Experiments at full scale have shown that vertically stacked combustible storage results in rapid fire growth. In fact, fire grows three times faster in vertically stored commodities than those stored horizontally. This makes extinguishing warehouse fires extremely challenging because they spread quickly and have immense increases in heat release rates – or the measurement of a fire’s size and rate of growth – over a short period of time.

The good news is that years of fighting fires have produced a wide array of sprinkler systems specifically designed to control and mitigate warehouse blazes. The most important consideration when choosing a sprin-

kler system is that the design matches the hazard. For example, plastic content is the most likely storage characteristic to contribute to a class IV or V high-hazard commodity classification (which denotes the most flammable products). The system installed must meet that classification and address the particular challenges that storing those products present. Below are the most common systems used to prevent not only plastic fires but all other flammable products as well.

Wet Pipe System

The most common and reliable fire sprinkler system is the wet pipe system. It is easily installed, maintained, modified and has a short downtime after a fire. This system consists of pipes where water is constantly stored, so when it activates, the water is immediately





Valves for the industry's most common fire suppression system, the wet pipe.

discharged. The disadvantage of this system is that it can have leaks if the pipes are damaged by impact (from forklifts, cranes or pallet transportation), and it is not suitable for cold storage with below freezing temperatures.

Deluge System

Deluge systems are also connected to a water supply through a deluge valve that is opened by the operation of a smoke or heat detection system. When fire or smoke are detected, the system is activated and water flows through the available sprinkler heads.

Early Suppression Fast Response (ESFR)

ESFR high output, high volume systems are located in ceiling spaces

as with conventional fire sprinkler systems. They incorporate very large high-volume, high-pressure heads to provide the necessary protection without the need for in-rack sprinklers.

In-rack Fire Sprinkler System

In-rack fire sprinkler systems are specifically designed for the protection of storage rack in warehouses. This system will not prevent a fire from starting; in fact, they rely on the heat generated by the fire to trigger them, but they will help contain the fire to a specific area and extinguish it. This system is a somewhat more complicated to implement, but it limits and reduces fire damage and loss of life. Compliance with fire safety codes is intended to provide a minimum

The most important consideration when choosing a sprinkler system is that the design matches the hazard.

level of safety. When designing a system, it is recommended to go with one capable of handling a high hazard classification – because once it's installed, it's very expensive to change.

Quell Fire Sprinkler System

The particular needs of cold storage facilities promoted the development of systems suited for application in these environments. The quell fire sprinkler system was created specifically for cold stor-

age environments, such as frozen food storage facilities and unheated warehouses. It is a dry sprinkler solution that does not rely on in-rack components or anti-freeze, which are prone to damage and difficult to maintain. This system employs a "surround and drown" effect, preventing damage to the warehouse and the stored goods.

Dry Pipe Fire Sprinkler System

The pipes in a dry pipe fire suppression system are filled with

pressurized air or nitrogen instead of water. The disadvantages of this system include its complexity, lower design flexibility, higher costs and maintenance costs as compared to the wet pipe system. Also, with dry pipe, the fire response time is longer, and there is a potential for pipe corrosion.

The Ecological Five

Several catastrophic warehouse blazes have shown that fire defense strategies should consider the po-

ADVANTAGES OF WATER SPRINKLER SYSTEMS

Wet pipe – easy installation

Deluge system – high discharge of water controls fire easily

In-rack fire sprinkler – localized fire control

Quell system – ideal for cold environments

Dry pipe – suitable for cold environments

ADVANTAGES OF ECOLOGICAL SYSTEMS

CO2 - fast, efficient, adaptable

FE-13 – ideal for large room and low temperatures

Heptafluoropropane – no water damage, no ozone damage

Victaulic vortex – small drops with less wetting, safe for people

Inegren – intact visibility for escape



Within the warehouse, allocation of certain flammable materials, such as paper products, need to be properly addressed with prompt and frequent trash removal and special handling and storage of flammable materials.

tential impact on the exterior environment. Among the environmental consequences to take into consideration, the noxious effects liquid runoff can have on nearby streams, rivers, lakes or below-ground drinking water aquifers stands as the most devastating. The toxic waste created by the contaminated water can poison water supply for a community and decimate the local flora and fauna. The fire plume carried on by the wind to nearby residential and business centers should also be con-

sidered. Smoke and ashes generated by the fire can cause an adverse reaction among the general population exposed to them.

Some fire extinguishing systems like the following five do not employ water to put out fires. Foam is used whenever there is a possibility of a liquid fire; the distribution of a foam blanket over a flammable liquid will snuff out a fire by eliminating the fire's oxygen supply and providing a cooling effect on the burning fuel.

CO2 fire suppression systems are the preferred extinguishant for a multitude of critical facilities. Fast, efficient and adaptable to a wide range of hazards, the discharge of carbon dioxide (a low cost clean agent) is non-damaging to property and electrically non-conductive.

FE-13 fire suppression systems were developed by DuPont as a chemical refrigerant; its molecules at the flame front absorb heat from a fire in much the same way a sponge absorbs liquids. It is an ideal application for large rooms with high ceiling structures in low temperatures, such as unheated storage warehouses. It also has low toxicity,



Todd S. Holder /Shutterstock

which lends itself to use in flood applications and in instances where people are present in the space during discharge of the system.

The chemical heptafluoropropane is a replacement for Halon 1301, which was deemed damaging to the ozone layer in the '80s. This system is waterless and provides an environmentally safe, non-toxic product that requires no clean-up and can



The items stored in a warehouse are not the only components to take into consideration – equipment and supplies used within the facility are just as important.

Designating floor storage and staging areas approved for stored materials will make it easier to enforce safety issues related to blocked aisles.

be used in rooms storing art or history collections or any facility in which water damage from a sprinkler must be avoided at all costs.

Victaulic vortex fire suppression systems use both water and nitrogen homogeneously to extinguish fires. The foil technology creates unique nitrogen and water suspension, producing droplets less than 10 microns (0.01mm) in size, a regular drop is approximately 500 microns (0.5mm). This smaller water drop absorbs more heat, while the nitrogen reduces the

oxygen feeding the fire. The smaller water drops mean that there is minimal wetting, dispersing just one gallon of water per minute per emitter in total flood applications, and the nitrogen is safe to use with people in the room.

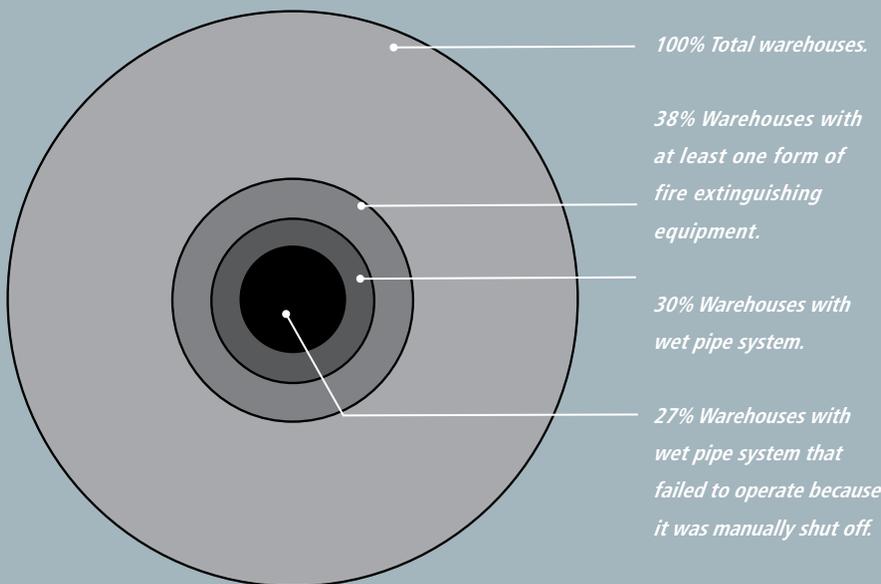
Inegren is an environmentally green three-dimensional fire suppression agent. It is a blend of three naturally occurring gases: 52 percent nitrogen, 40 percent argon and 8 percent carbon dioxide. Inegren is safer than carbon dioxide systems because it reduces oxygen concentration only

enough to suppress combustion while stimulating breathing efficiency. This gas produces no 'fog' during discharge, so escape routes remain visible. The blend is stored in cylinders and produces zero ozone depletion, no global warming and no atmospheric lifetime. It is also ideal for any storage that cannot be exposed to water.

Within the warehouse, allocation of certain flammable materials, such as trash or aerosol cans, need to be properly addressed with prompt and frequent trash removal and special handling and storage of flammable materials. The items stored in a warehouse are not the only components to take into consideration – equipment and supplies used within the facility are just as important. Products like aerosol cans present particular challenges as well, especially when in contact with nitrogen-based systems. During a fire, aerosol cans can propel themselves across a warehouse, carrying a trail of fire behind them in what is called "rock-eting," propagating fire at great speed along their path and presenting a danger to the workers trying to evacuate.

Designating floor storage and staging areas approved for stored materials will make it easier to enforce safety issues related to blocked aisles. As with any safety system, they are only as effective as the methods of communication used to educate warehouse personnel of their existence. [M](#)

THE EFFECTIVENESS OF WET PIPE SYSTEMS





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Taking the Dents out of Bolted Rack

Why bolted rack is making slow, begrudging, long overdue inroads in the North American welded market.

by Adam Shafer and David Batka

For over 65 years, North America has resisted the worldwide concept of steel rack construction. Until 2001, the United States was an entirely pro-weld country. A decade later, only a slight shift has been made to combat the misinformation about bolted's benefits. The tried and true method in the States has always been to utilize the welded side bracing of selective upright columns, primarily on the perception that welded steel is stronger, more reliable and cost less to install.

Welded products arrive in an end-user's facility assembled, and therefore must be sturdier and invulnerable to damage. Contrarily, the stigma against bolted rack has long existed that if a product has bolts, it is only a matter of time before those bolts come undone. Neither belief is true. However slowly, businesses are discovering the benefits of bolted rack. In the face of a struggling economy, the U.S. is looking for an alternative to the industry standard; anything that will improve efficiency



The cross-bracing pattern of a bolted frame.

and increase profits. The conventional wisdom across all nations has long been that if rack does what it is designed to do, customers won't care how the frame was constructed. Reliability and affordability is king, which leaves the customer to determine which is the more affordable construction and if it does what it is designed to do?

Structural Differences

The differences between the two racks are subtle enough that manufacturers on both sides have gotten

away with making misleading claims without ever having to account for them. The largest difference lies in the rack connections; whether the uprights and beams are connected by bolts or by welds. Beam diagonals are the most visually obvious difference between the two styles of rack connectors. Welded strut patterns generally avoid connecting two struts on the same part of the upright. Often with the k-bracing or wind-bracing of the bolted systems, two diagonal struts will share the same bolted hole in the upright. The reason for this is simply because a weld covering two different connections isn't as strong as a weld covering one. A bolt, however, can handle two connections. "The differences

in structure don't just come down to beam diagonals, the posts are different," explained Linda Demke, CEO at Interlake Mecalux, one of the few companies manufacturing both welded and bolted product. Bolted posts were designed using the metric system, while welded's products were not, which is one of the reasons the post sizes for bolted rack are slightly larger. "There is no advantage or disadvantage," Demke says. "They're just different."

Assembly Differences

One of the oldest knocks against bolted connections is that a third-party is in charge of assembling them. The assumption being that a third party runs a higher risk of

Racks take abuse...repairing a bolted rack is generally easier and quicker than a welded unit.

assembling the rack incorrectly. Rarely, if ever, is bolted rack maintenance pawned off on a party not pre-approved by the manufacturer or distributor. Many companies have trusted stocking distributors at the ready, carrying its knocked down product. By doing this, the bolted rack manufacturers save on shipping costs, maximizing the containers in which the product is shipped. This gives these distributors the ability to service the market with whatever size installation may be necessary, making bolted rack the ideal for smaller applications in which selective racking is to be utilized. It's far more cost-effective to

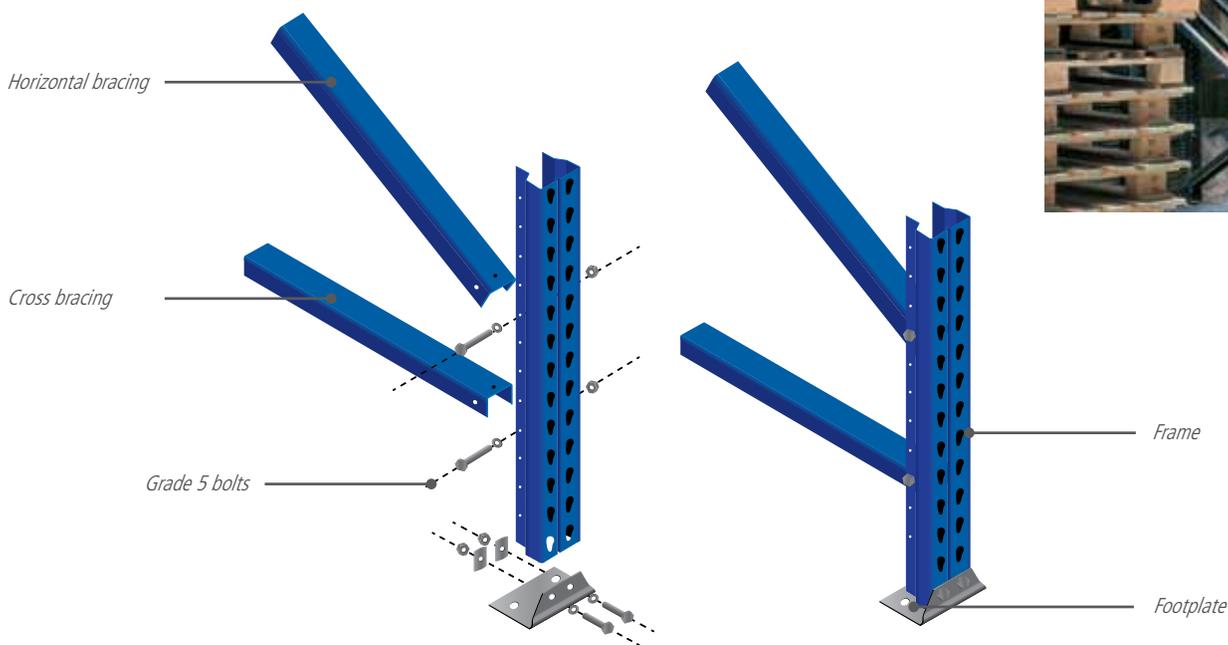
ship bolted systems than welded ones because the structure can be broken down, requiring less space on the truck, which means more sections of bolted rack – almost twice the weight of welded – can be shipped at a single time. Then once the rack reaches its destination, its assembly requires little more than a pair of sawhorses.

Knocked Down, Drag-Out

Unquestionably, racks take abuse. Being hit with forklifts, constantly storing and removing pallets and various other human errors all add to the wear and tear of a shelving unit, and the inevitability of repairs. But repairing

a bolted rack is generally easier and quicker than a welded unit. "Selling bolted to a welded market is all about serviceability," Demke says, adding that in most cases, "it is easier to service a bolted frame if it's damaged." With a welded pallet rack, the damaged piece needs to be torched or cut off. The loads are then removed (which would happen with bolted rack, too) and replaced with a repair kit often comprised of – ironically – bolted frame. And while not having to remove beams is nice, it doesn't add to the overall efficiency of the repair process, as most facilities disallow repairs to welded rack during work hours because it is necessary to shut

BOLTED FRAME DIAGRAM



down an aisle or existing area during the cutting process.

Another misperception of bolted rack is that, without constant attention, the nuts will unthread from the bolt and the structure will fall. This was the false refrain singled out above all others by Greg Hajdus, a structural engineer with Interlake Mecalux. "I've heard many times that if you have bolted frame, every once in a while you will have to go in and tighten the bolts," Hajdus says, "but that's not true. When you've got bolted frame, when it's assembled correctly, you don't have to do anything with it. Ever."



Even after being given time and space to perform the repair, the weld may still be faulty. It may have been undercut, given too much or too little heat, or a lack of added flux core; all of which are human errors common to bad welds and broken rack. The problems with repairing welded rack and worrying about welder fluency don't exist with bolted selective shelving. Every bolted piece is machine manufactured and passed through strict

THE ADVANTAGES OF BOLTED

Many companies have trusted stocking distributors at the ready, carrying its knocked down product. By doing this, the bolted rack manufacturers save on shipping costs.



There is always the chance of a faulty weld caused by human error. With bolted, every piece is machine manufactured and passed through strict quality testing.



Servicing damaged bolted frames is made easier by not having to torch off the damaged piece.

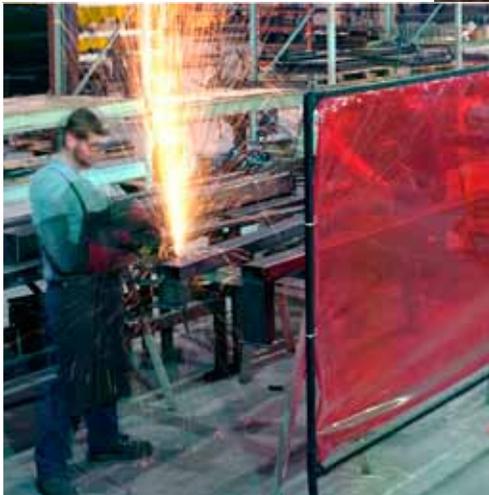


quality testing. Additionally, the restraint provided by bolts and welds differs. Welding a brace provides it with a certain amount of end restraint. The more end restraint, the more the carrying capacity of the rack. Reducing the brace's buckling length enhances the restraint, however if a weld – often applied by a human – is faulty, the rack's capacity could be reduced to as little as zero, perhaps without the end-user realizing it. The same results would occur for a bolted rack with faulty connections as with a welded rack, but the risk of it happening is so much lower. Bolted frames have well-defined and highly controlled buckling length. In short, if a bolt is missing,

“When you've got a bolted frame, when it's assembled correctly, you don't have to do anything with it. Ever.”

~Greg Hajdus

Structural Engineer



“The quality of the welded connection is always somewhere between excellent to non-existent...you have to test it.”

~Miguel Lopez
Interlake Mecalux
Sales Manager



Top: Olegusk /Shutterstock

you'll see it. If a weld is bad, you probably won't. Miguel Lopez, an area market manager for Interlake Mecalux and one of the first to regularly sell bolted rack in the United States, agrees. "The quality of the welded connection is always somewhere between excellent to non-existent," Lopez says. "But you have to test it." If repairs are necessary, a warehouse's maintenance engineer can take care of them immediately with an adjustable wrench and socket set. Bolted

rack may cost more to install, but customers save on the back end by not having to cover the costs of certified welders and on the front end by saving on the shipment of the parts. Likewise though, if a weld breaks, the shelving's structural integrity is in jeopardy. Bolted units are safeguarded against such a catastrophe, even in the unlikely incident of a nut and washer coming off a bolt, the unit will still hold because the bolt is in place. However, all Interlake Mecalux bolted

selective shelving units bolts have serrated nuts, ensuring that this does not occur. May it be welded or bolted rack, regular warehouse maintenance is still needed to ensure safety. One doesn't bring their car to a mechanic and ask for every bolt to be torqued down, so the fear of a bolted selective rack coming apart is a moot point.

Even the type of steel – whether it is galvanized or not galvanized – illustrates bolted rack's superiority.



There has been a subtle shift in the market as major corporations have begun to install AS/RS systems structured around bolted rack...

Galvanized steel does not rust and therefore meets the regulatory codes for pharmaceutical and food industries. Galvanized steel however is more difficult to weld than bolted's hole punch because the zinc coating gives off toxic fumes and weakens the coating's integrity. Even if coated frames have been safely welded, the steel still needs a second dip to restore the coating; an unnecessary step with bolted rack. Because of these factors, many of the parts are welded together first, then coated. Doing this creates difficulty in coating unexposed surfaces.

There has been a subtle shift in the market as major corporations like Wal-Mart, Target, CVS and Home Depot have all installed AS/RS systems structured around bolted rack – a small-but-substantial step in bringing such rack into the North American mainstream. That mainstream isn't likely to turn its back on welded anytime soon. There will always be a market for welded. But a shared marketplace in which each customer's budget, timeframe and storage are evaluated, is on the horizon, a vision long overdue for warehouse owners interested the best deal instead of the standard one. 



Inside the Margin of Success

Your company's logistical operations may be the last part of your supply chain, but far too few companies make it their first priority.

By Dave Batka

Logistics is the backbone of the supply chain and focuses on performance and costs, but it can be trickier than walking a tightrope when decisions have to be made. Julius Caesar created the term "logista" to describe an individual who organizes troops and supplies during war time. To be victorious in the battle of commerce, one needs to have every move of their business plan mapped out in advance. But, as history has shown, there is no one way to win a war. Companies within the same industry can go about their logistical production in different manners, but still receive profitable end returns.

Two main forms of logistics exist: production and management. Production logistics focuses on the processes within an individual business; ensuring the correct amount of product is being machine-produced, and that the system is working efficiently. Companies that produce different models of a product each year concern themselves logistically with production, considering when a new product line is soon to be released – they want to move the remaining goods from the previous batch. Logistics management, also known as materials management, plans, implements and controls the efficient movement and storage of goods and services.

Logistics management follows a good from its initial purchasing in raw form to the time it reaches the consumers.

Comparative Logistics

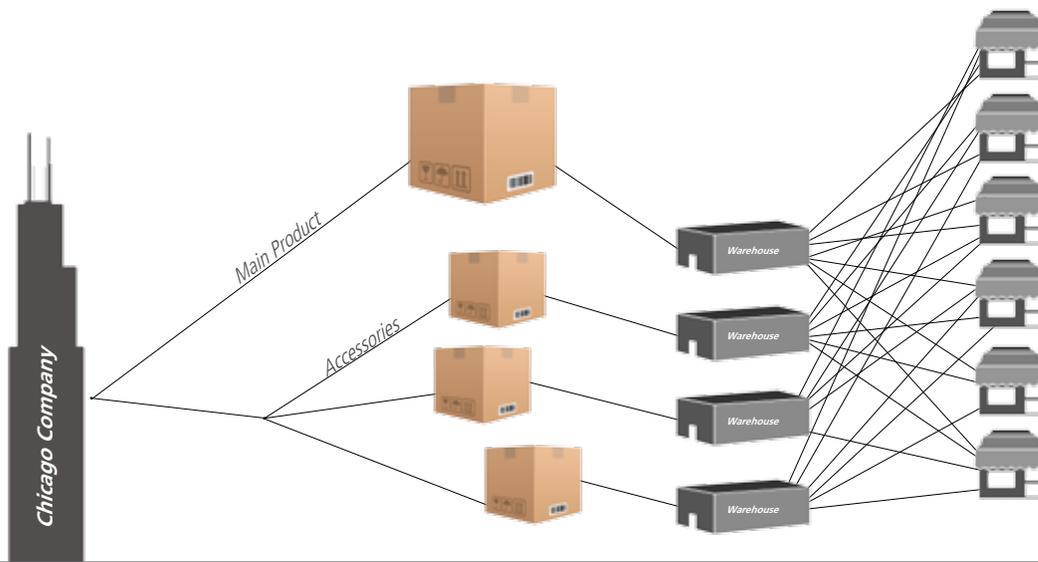
Electronics manufacturers based out of Chicago and New York may produce similar products and target the same audience, but their logistical management operations are not likely to be similar. For instance, the Chicago manufacturer outsources the production of

the main product to a single company in China, while producing that product's accessories through several different manufacturing organizations. These companies then ship the finished products directly to the distributors and retailers whom, in turn, distribute to stores throughout different regions and sell directly to the consumer. Those retailers and distributors, in this instance, are the first to have every piece of the product in the same place.

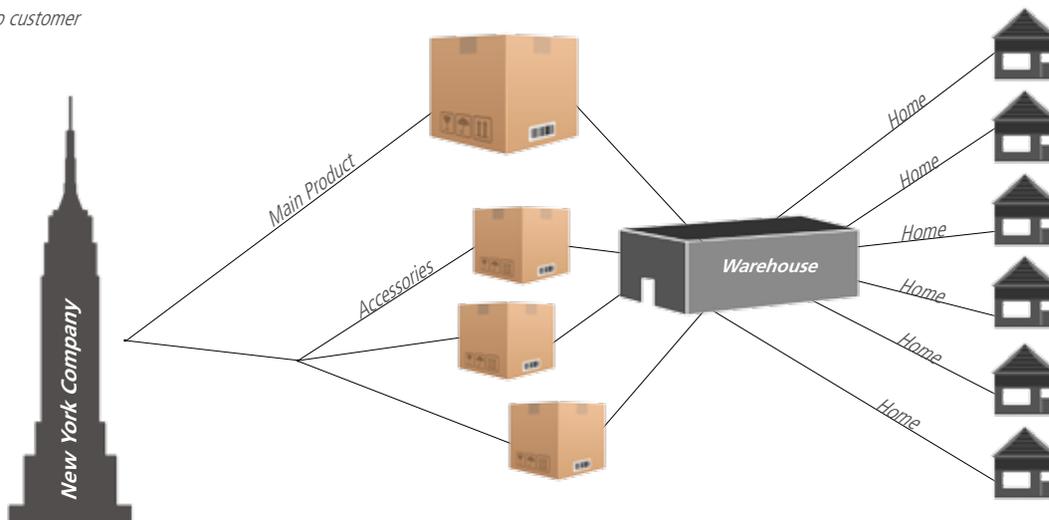
The New York company, on the other hand, takes a varied approach; outsourcing the production of their main product to multiple overseas producers as well as all of the accessories, similar to the Chicago company. Unlike the Chicago company, however, once the products are finished, New York's goods are shipped to a single warehouse. To order either the main product or any of its accessories, consumers must visit specific locations or

LOGISTICAL SYSTEMS: RETAIL VS. DIRECT TO CUSTOMER

Retail



Direct to customer



a single website such as Amazon. The website or designated vendors send a request to the warehouse which then ships the final product directly to the customer.

By the Chicago company keeping the production of their product centralized in one location, it decreases any logistical confusion and, if need be, allows for changes to be made quickly and efficiently. The opposite clearly applies then for the New York based electronics firm. By spreading the production of their main product out over several different manufacturers, communication becomes cumbersome and convoluted, especially if any of these companies outsource production of their own parts to other manufacturers. Immediate changes that are needed may not happen,

thus slowing production. However, with outsourcing production over several different manufactures, the New York based electronics firm is safeguarded against disrupting production if a catastrophe should occur in one plant or another. Companies like Sony and Panasonic who have a significant portion of their production line centralized in one area were throttled and forced to shut down part of its manufacturing when Japan was hit with an earthquake in the spring of 2011. While the lull in production didn't cripple either corporation, smaller companies with this model may not have been able to weather the storm. However, with the New York company only distributing its product through specific stores or a single website, logistics is lessened on the manufacturers

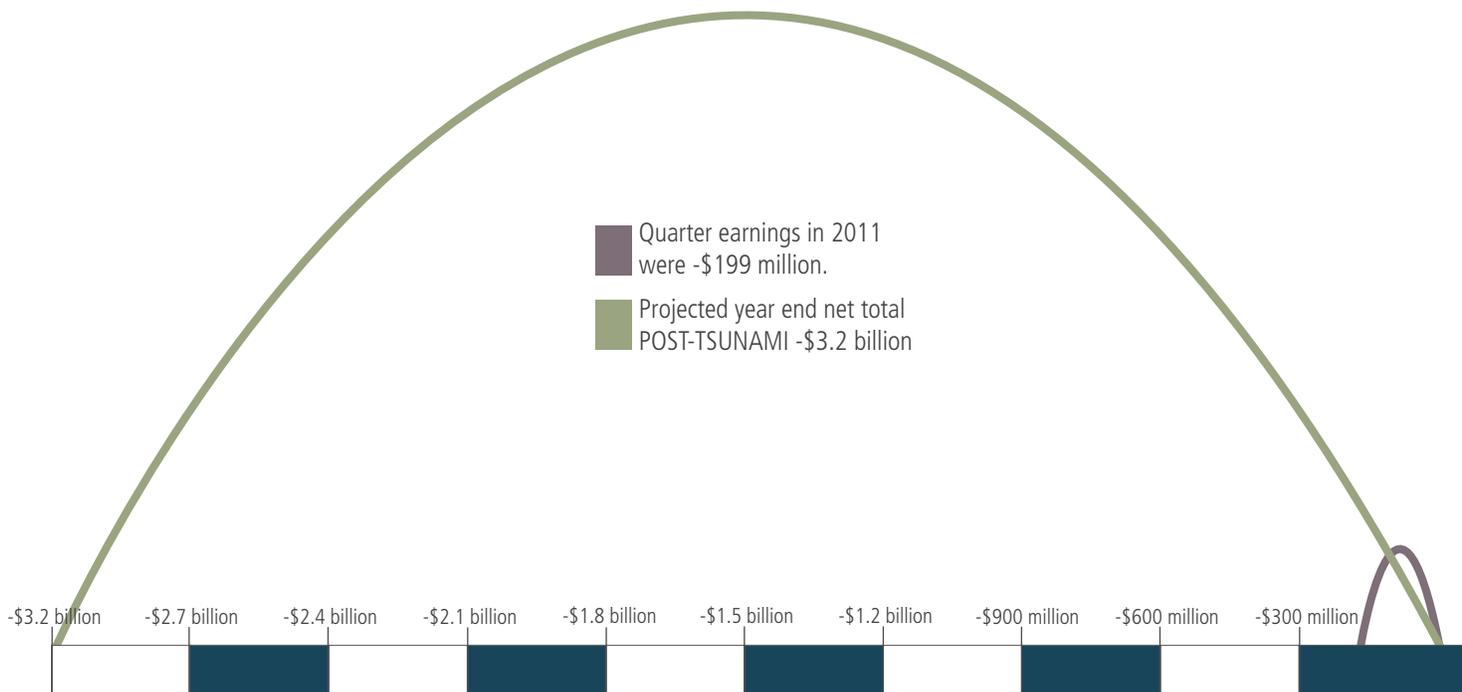
behalf, given that they do not need to worry about implementing multiple 3PL shippers to transport their electronics to separate vendors and retailers; the outsourced warehouse would manage this aspect.

Fauxgistics

New York's retailers are all under the same company umbrella, which gives the sales of their product more cohesion and exclusivity, similar to how designer clothing brands only offer their product in select high-end stores. Though, they do risk the possibility of intellectual property theft, such as Peerless Industries, an Illinois based company that produces flat screen television mounts. "Knockoffs of our products started showing up in markets here in our own backyard," stated Michael Campagna,

SONY'S PRE/POST TSUNAMI PROJECTIONS

← **LOSS**



Peerless' COO. "It wasn't necessarily our supplier doing it—it was our supplier's supplier." Consumer electronics powerhouse, Apple, has also been plagued with having their products ripped-off and passed as genuine for years. Phony overseas stores even opened up using the company's trademark logo and had the same décor and ambience as their genuine counterparts. As reported by Reuters in August, over 300 of these stores overseas came under inspection this year for passing Apple product clones with dozens of them being shut down. Oddly, some of those employed in these stores thought they truly worked for Apple.

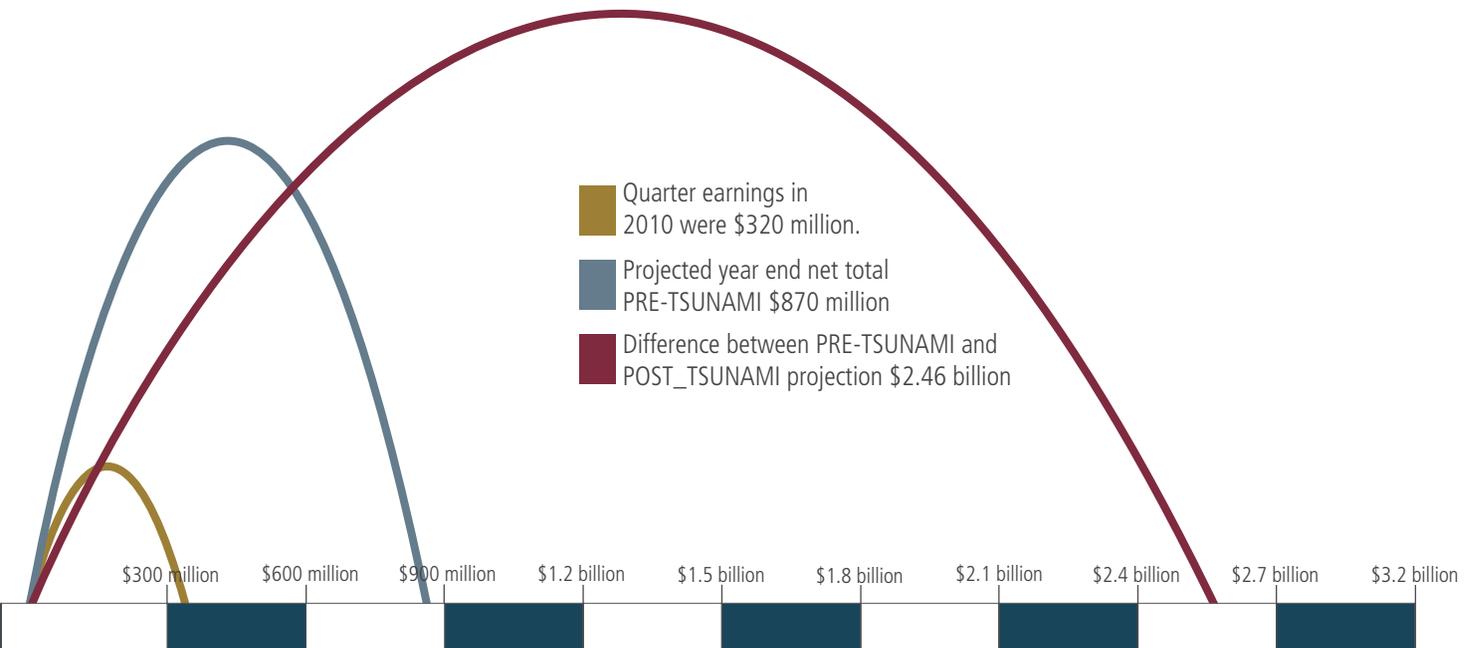
Conversely, the Chicago electronics firm gains the opportunity of not having to control the managerial lo-

gistics of running the distributors and vendors day-to-day operations as the New York based company does, and with allowing this, the Chicago firm could possibly reach a broader spectrum of consumers. But, they lose the feeling of exclusivity, which could, in turn, detract from business.

Though, as both of these models show, there is no universal singular way to go about conducting logistics for a business. What works for one organization may not necessarily work for another. The key feature that both companies share is the notion of safeguarding; though, they each do so at different stages throughout the manufacturing and shipping process. Businesses need to weigh the pros and cons of all their logistics decisions before implementing one set way.

There is no universal way to go about conducting logistics for a business, though the key feature that both strategies share is the notion of safeguarding.

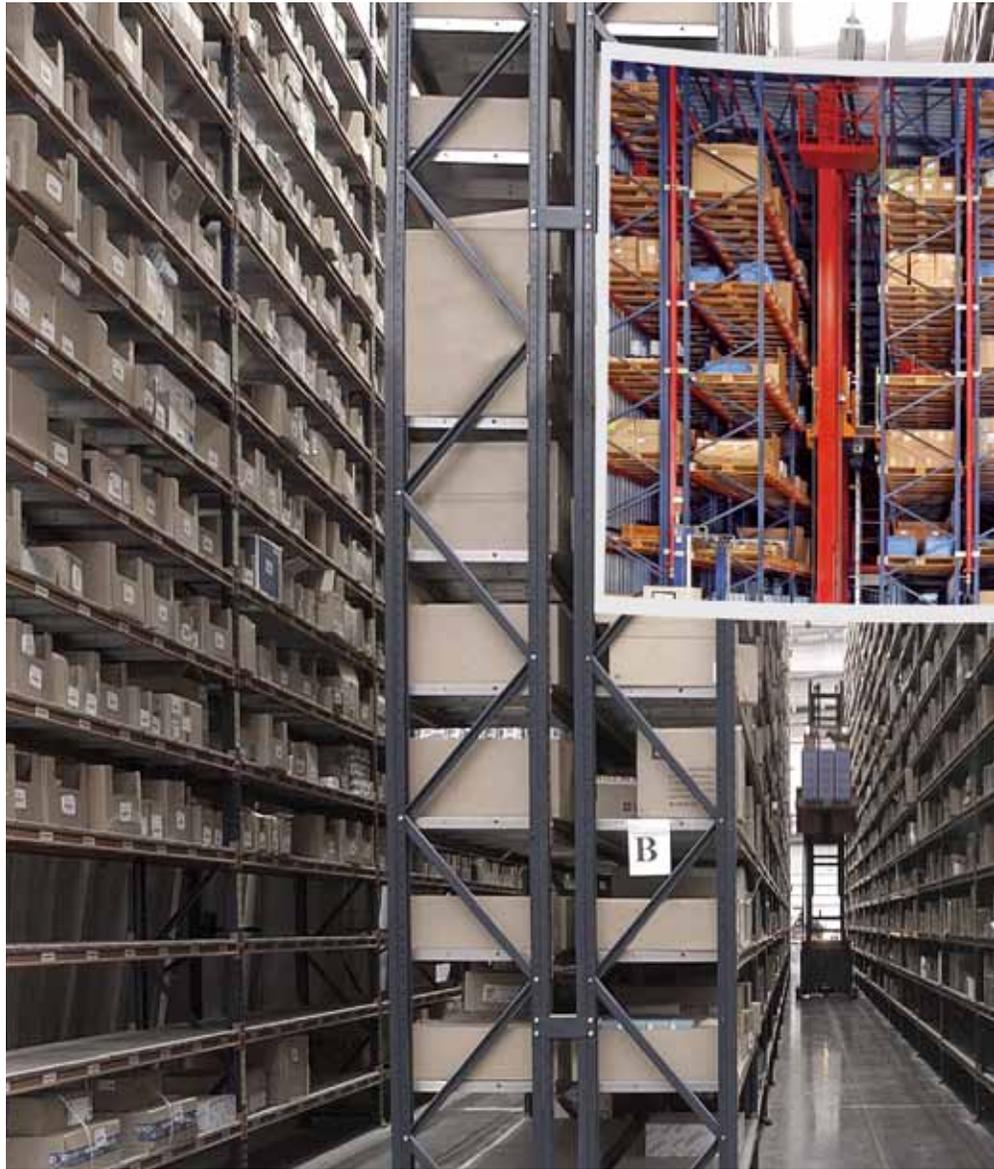
PROFIT →



Semi-Automatic Solutions

As companies' need to expand wrestles with their need to save, the three stages of partial automation have quickly emerged from the middle.

by Adam Shafer



Balance is both hard to come by and inherently necessary in times of economic hardship. Just as warehouse owners look to contain costs to maintain their business, so too are they looking to upgrade their space to maintain market positioning – two

peas not necessarily in the same pod. The general consensus has long been that either stashing finances in the short term or shelling out for full automation with the intention of lowering long term costs were the two extremes devouring the middle



The general consensus has long been that either stashing finances in the short term or shelling out for full automation with the intention of lowering long term costs were the two extremes devouring the middle ground.

ground. But lately the middle ground has become a necessity for warehouse owners. Instead of spending for full automation or sitting tight until the storm blows through, some warehouses are benefiting from creatively and systematically automating just portions of the facility.

Between 2000 and 2007, the industry saw a demand for warehouse automation. Developing economies like China refined production at low cost, while major manufacturing powers like Europe and America turned to more disposable products that necessitated larger quan-

tities of goods to meet demand. These developments, for different reasons, created a fruitful period for warehouse automation; everything from loose products to complete pallets and boxes were being turned over at higher yields. By 2008, with the economic thrash-



Every owner's first step toward partial automation starts with evaluating where inefficiencies are most prevalent and then matching those inefficiencies with solutions that alleviate them.

says. "Nowadays, the majority of the automation investments are made only to warehouse management or to parts of a warehouse."

What businesses have found with partial or "adapted" automation is that it enables them to reduce production costs without a big investment. And not making a big investment in lean times allows businesses to remain competitive.

Order picking and product dispatch are two areas that often prove logistically inefficient and costly. Fernandez recognized partial automation's ability to optimize order preparation through optimizing the ergonomic sensibilities of a warehouse using the product-to-man concept in parts of the production process with the highest cost. Customers necessitate the most energy and time. Scheduling, estimating costs, planning delivery and communicating each appropriate step are equal parts mandatory and time-consuming. Partial automation is more than just automating half of your space, leaving the other to atrophy

ing brought on by the global recession, the trends of the previous seven years were slowed, halted and then reversed. Hipolito Fernandez, one of the Mecalux Group's regional sales managers in Spain, explains that in 2008 banks were locking down the credit

they were throwing out the front door just 18 months before, and a surplus of warehouses developed without enough product demand for those warehouses to operate. "The warehouses that are being built today generally do not have complete automation," Fernandez

AUTOMATIC FOR THE PEOPLE

There are a variety of affordable semi-automated solutions to fit your storage needs while still remaining in concert with the market requirements. Each of these products offer full flexibility and room for growth without necessitating a large investment.



EasyWMS: Powerful warehouse management software capable of covering all needs regardless of the warehouse's size or type of product.



Clasimat (VLM): Automatic storage that can store small and medium-sized products vertically up to 50 feet.



Spinblock: Automatic horizontal carousels, epitomizes the "product-to-man" concept by enabling a single worker to prepare up to 400 lanes alone.



Movirack: Palletized shelving on mobile bases doubles warehouse capacity without losing direct access to any pallet stored.



New range of mini load stacker cranes of medium and high yield, capable of manipulating different cardboard or plastic boxes weighing up to 220 lbs per unit.

MTO: Enable automation of palletized products with existing shelves in existing areas up to 49 feet high, without big investments.



MTBO: To automate warehouses without great requirements in the number of cycles, capable of operating in double depth, increasing the warehouse capacity and also with a small investment.

New range of stacker cranes for pallets, more efficient and capable of storing palletized products up to 147 feet high.



Radio-Shuttle: Semi-automatic or automatic carts reduce manipulation times in compact pallet storage.

– it's about combining practices and using automation to better serve that function.

Every owner's first step toward partial automation starts with evaluating where inefficiencies are most prevalent and then matching those inefficiencies with solutions that alleviate them. Projecting your facility's growth and then mapping

how to reach those projections are the most difficult and overlooked detail of warehouse management. It is important to think of your space as a work in progress. Installing one system without planning on future integration risks kneecapping future warehouse integration. Saving for the future often leads to stunted growth in the meantime. Building for the future – the

principle ideal behind partial automation – provides a gradual incline that starts today.

The demand for full automation has had a significant chunk ripped from it during the global recession, as the majority of companies have opted to stop spending. Many customers looking for

Partial automation is more than just automating half of your space, leaving the other to atrophy – it's about combining practices and using automation to better serve that function.

warehouse solutions are also looking for a shorter ROI than they were five years ago. Turning to a half-manned, half-machine approach usually means less money involved and less return on the investment, but a much faster return. As Luis Escobedo, part of the Mecalux Group's R & D department explained, in today's economic climate, a fast ROI keeps financial resources available to companies while still allowing growth. "We see sale increases of products with high storage



What businesses have found with partial or "adapted" automation is that it enables them to reduce production costs without a big investment.

density and high productivity," Escobedo says, "and lower total cost of ownership than conventional manual warehouses." As businesses are starting to see some long overdue financial growth, the idea of developing a fully automated warehouse in stages is replacing the common practice of a one-shot facelift.

Stage 1

This is the first and least impactful step into the automation process. Think of it as categorization automation. Warehouse owners aren't automating their products as much as they are automating the labeling of those products. By sparingly incorporating only a few devices such as automated verification systems (AVS) that improve the speed and efficiency of a dispatch area with barcode readers that capture multiple codes simultaneously. Starting small with simple, cost effective devices offers a way to optimize standalone processes to improve productivity and accuracy levels, without having to re-engineer the rest of the



warehouse operation. Consequently, it is much less costly to implement, and allows for greater flexibility should future changes to the warehouse be required.

Stage 2

Once an automated categorization takes place, the next destination on the development map would be to install isolated systems used to optimize small sections of the facility. If a warehouse owner of a pharmaceutical

facility had just installed a robust AVS network and fitted the personnel with voice picking applications to start the automation process of the warehouse, Stage 2 might bring about a Spinblock or MTBO unit that can be installed into an existing space without affecting other sections. If Stage 1 is the automation of labels and categories, Stage 2 automates some of the secondary operations in the warehouse, allowing the bulk of the personnel to focus on

the main products. If one quarter and three nickels represents the products in your warehouse, the Stage 2 installation of a simple Clasimat or other self-contained automation optimizes the nickels so only the quarter need be operated through manual communications.

Stage 3

This level generates full synergy throughout the plant, but the method of achieving this synergy was developed by alternative means. Large companies opening storage facilities are likely to automate straightaway. While whole and immediate automation is unlikely with the majority of warehouse owners, matching the end result of those large companies is much more of a reality. Each stage is an investment; Stage 3 completes that investment. Flexibility is king, especially in a volatile business climate and this is where the all-important automation mapping should reach its logical end. Movirack, Radio Shuttle and the like should all be incorporated into the space. The EasyWMS software the organizes the Stage 2 VLM can be rolled over and incorporated into the new MT0. The efficiency of the AVS will reach its full potential now that it is scanning in the massive materials loaded onto the Miniload AS/RS. By Stage 3, partially automated warehouses have developed the facility growth that might never have happened by saving until full automation was possible.

Large corporations with significant e-business sales will always increase control and performance through automation, but the agape mouth of



these whales also serve as the force driving all the smaller fish toward survival. Smaller facility owners are finding that the only way to survive the whale is to avoid getting swallowed whole by maneuvering intelligently. Partial automation is a proactive investment in the future that begins with a goal, a plan and three stages of action. Ultimately, the ROI analysis of partial automation became too attractive to be overlooked, especially as companies worldwide identify every avenue for capital gain in this recession. For a storage facility to see its maximum

competitiveness and efficiency, full automation is the undeniable method to get there. But for many companies in the last three years total automation hasn't been possible. It will be again, at some point in the future, but until the economic situation permits this, partial is the appropriate solution and one widely spreading throughout the industry. The result has been continual signs of compromise between cost containment and growth; a compromise that has provided both safety and profit during a time where both are difficult to come by. 



Readers Between the Lines

The increasing capabilities of image-based ID readers are capturing more than just the attention of the materials handling industry.

By Dave Batka

When the Ritty Model I cash register came to market in 1879, businesses gained one of their first revolutionary pieces of technology. The Commodore PET and Apple further overhauled commerce when introduced in the late '70s, spurring multiple industries to adapt to computing technologies. With dozens of new innovations introduced into the market each month – all claiming to be unsurpassed – selecting the technology with which to adapt is not as simple as it has been for previous generations. While no current product is poised to revamp

business as the cash register and computer did; there are smaller innovations making everyday functions easier. The introduction of high-speed, superior-accuracy image-based ID readers (IBR) has compelled the trend for business owners to consider transitioning their business toward a more scanner-ready operation. Laser scanners have been standard in the material handling industry for decades: they are easy to install, operate and use on multiple barcodes to be read at high speed. With the advent and ease of Internet shopping, coupled with the grow-

ing volume of products shipped from warehouses to vendors and retailers, logistical data has become paramount in aiding organizations and reducing costs through automation. As a result, image-based ID readers are changing the way the material handling industry does business.

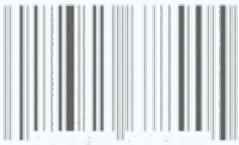
Traceability

Tracking a product through the production supply chain is integral, and this process relies on barcodes retaining a high visibility quality. But, with being handled numerous times and moved from one location to another, errors will occur with the barcode. Image-based readers record and give feedback on print quality, so producers can make adjustments to barcodes before the product is shipped. This feature keeps a supply chain running smoothly and decreases the allotment of extra man hours for errors.

Performance

Proficiency is about speed and accuracy, and this is what to analyze when considering making the transition from laser scanners to image-based readers. Image scanners were once thought to be too expensive for businesses to implement in their day-to-day operations, but with advanced microprocessors, imaging sensors and decoding algorithms, these scanners have not only become more affordable, but more powerful than ever before. Conventional laser scanners operate through light reflected off a printed barcode. But, these types of scanners fail if barcodes are printed improperly, damaged, or any number of common issues that arise (see fig.1). Image-based ID readers work by taking a picture of

NOT A SCANNER BUT A READER



Faded



Perspective



Scratched



Uneven



Bad Print



Warped



Lector620/SICK, Inc.

The image-based card readers of the SICK product family combine the latest technology for rapid computing performance with high-quality matrix sensors.

the entire image and reconstructing any damaged or unclear sections in an effort to override issues associated with unreadable barcodes. It uses optics and codes printed with UV ink to overcome conventional laser scanner hurdles. Given all of these factors, image-based ID readers have an impressive read rate. Higher-end models

can read upwards of 1,000 frames per second, which lets a variety of package sizes be read and recorded moving at speeds upwards of 500 feet per minute (152.4m/min).

Image-based readers also allow for one-dimensional barcodes to be read from 360 degrees, whereas laser

With the cost of image-based readers dropping... traditional laser readers are rapidly becoming old technology.

readers need multiple passes or adjustments to read a barcode situated awkwardly. This allows image-based readers to be utilized on shipping lines where 1-D barcoded items are not always in the same orientation – again increasing efficiency and productivity. A matrix code, better known as a 2-D barcode, is a two-dimensional representation of information. 2-D codes are similar to 1-D barcodes but are capable of representing a greater amount of data,

and these types of codes are heavily infiltrating industries such as pharmaceuticals and retail where great amounts of information need to be stored. 2-D codes allow a product to be tracked throughout the entire manufacturing and supply chain process. Image-based readers are capable of reading poorly marked 2-D codes and those on curved surfaces thanks to their ability to interpret advanced algorithms. Laser scanners don't have this ability.

Usage

While a warehouse may consider making the transition from laser readers to image-based readers, it's important to know that not all image-based readers are of the same caliber. The most sophisticated image-based readers have algorithms that can decode and search for a multitude

of barcodes of any type. This ability allows an operator to configure the output method, making it much easier for the operator during use. Manufacturing and supply chains must take into consideration the speed with which goods move through assembly and shipping. Doing so will determine which IBR best fits their needs, considering the ones that have a faster capture rate are more expensive. With the increase of Internet shopping, suppliers are shipping more products – and read error mistakes – than ever. If a supplier's read rate is 96 percent per day, that 4 percent error rate can mean hundreds or even thousands of lost dollars, depending on the amount of goods being moved. Image-based readers give supervisors and managers the ability to analyze and adjust how products are loaded onto lines by taking an actual image of faulty or

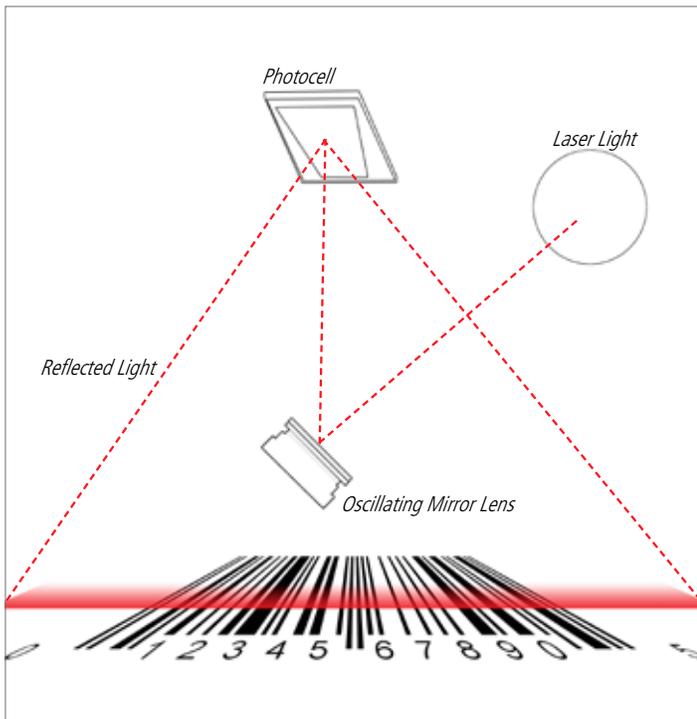


Figure 1: Illustration of a bar code scanner.

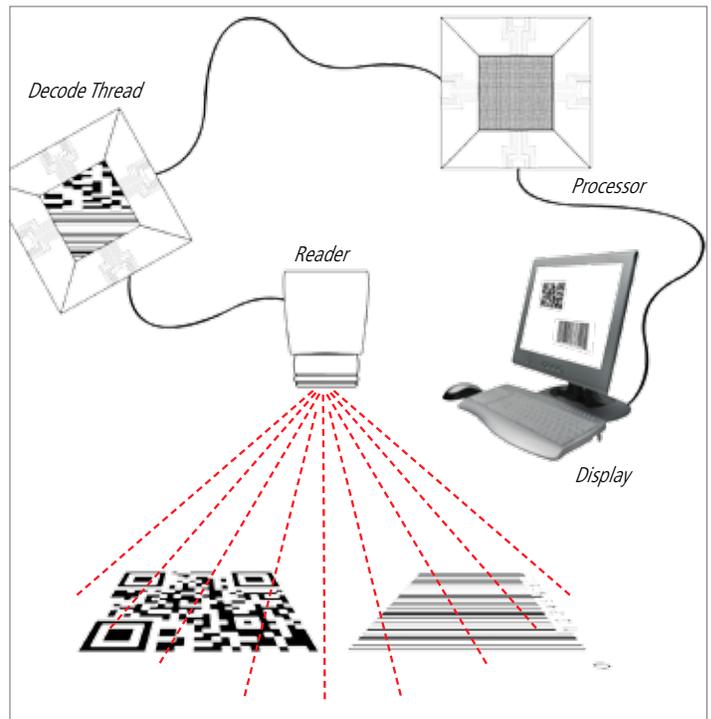


Figure 2: Illustration of an image-based ID reader.

unread barcodes, highlighting present problems and possibly saving a considerable sum in the long run.

Archiving

Image-based readers record both barcodes that have and have not been read successfully, which allows for troubleshooting and interpretation later of why a code wasn't correctly read. This also helps keep inventory under control so parts that have been scanned, and those that haven't, can be kept separate. This information is stored, so when a faulty barcode passes through later, the image-based reader can recognize parts of the label and reconstruct the rest, ensuring the movement of the product is uninterrupted and reaches its appropriate destination. Industries such as aerospace and automotive are using image archiving to ensure superior traceability among products during manufacturing.

Maintenance

Less is more when it comes to needed repairs. Unlike laser scanners, which have motors and rotating mirrors that move the lasers across barcodes, image-based readers have no moving parts, safeguarding themselves against mechanical failure. These readers are also packaged in tough industrial casings, diminishing the likelihood of cracking or breaking, allowing for next to no maintenance and long-term reliability.

Image-based readers also allow the operator to view the read rate statistics of codes and look at the images as the reader captures them.

NOTABLE IMAGE BASED READERS



Lector620/SICK, Inc.

SICK Lector 620

- Decodes most popular 1D & 2D direct park markings
- 25mm-500mm reading distance
- 60 Hz scanning frequency
- Reads 1-50 codes per interval
- 135 MB Internal image storage



DataMan 500 fixed-mount barcode reader/Cognex

DataMan 500

- Doesn't have to be positioned optimally to achieve high read rates
- 1,000 frames/sec Image acquisition speeds
- 90 codes per/sec read rate
- Decodes the most challenging matrix codes
- Powered via Ethernet cable

This lets the operator quickly and efficiently analyze if there are any problems in the system or why a code isn't scanning correctly. Changes can be made during this process through the online viewing system, disregarding a need for an operator to find a manual for help.

Future-proofing is integral for business when making any changes in a production line or business model. It is important to gauge immediate

needs, but attempting to see growth in two to five years is vital as well. Varying degrees of image-based readers allow upgrades from 1-D to 2-D barcode reading, and some of the more progressive models have firmware updates, which upgrade the system to meet the latest decoding methods. With the cost of image-based readers dropping and the growing integration of 2-D barcoding, laser readers are rapidly becoming old technology. 



A Turning Point Named Crisis

Interlake Mecalux takes the challenges of the market crisis and turns them into opportunity for growth.

by Marta Jiménez-Lutter

The word crisis has become globally ubiquitous. Terms like “financial crisis,” “oil crisis” and “real estate market crisis” have permeated the news and captivated our attention for at least the past four years. Etymologically, crisis comes from the Greek word “krisis” meaning a turning point for better or worse. Interlake Mecalux has taken the global population’s crisis



mindset as a decisive moment to grow and expand, to be a bigger and better rack manufacturer in the face of economic hardship. Since a company is a compendium of all its parts (engineering, manufacturing, customer service, sales and marketing), synergy and cooperation between each part is the only way to succeed and get ahead in this market. In the face of adversity, only the skilled make it.

Sales' Biggest Buzz Words

The sales industry is seeing surprising growth in certain regions of the country that have maintained a solid manufacturing presence, as is the case in North Carolina, Minnesota and Wisconsin. Below are the five most prevalent skills-based keywords found in resume searches in these three states:

1. Outside Sales
2. Development
3. Leads
4. Closing
5. Aggressiveness

Source: <http://www.rezScore.com>

sides the obvious new installations, are relocations to new areas and enlarging existing facilities. Kris Rossmiller, Midwest account manager for Interlake Mecalux, explained that, "with the uncertain economic times we are facing, customers are more concerned about cost than ever. Customers are becoming more aggressive shoppers and they get more quotes from suppliers prior to making a purchase decision than they had in the past." Now, more than ever, companies have to make better products, provide better service and work harder to close deals.

Interlake Mecalux counts on its sales force and distributors to keep its name in front of the customers, so when the time comes to outfit a warehouse, the company's rack will be among the first considered. But that is only the first step in the process and having a foot in the door is no longer enough.

Neil Camberg, President of Warehouse Rack, an Interlake Mecalux distributor, agrees with Rossmiller's assessment of the challenges facing the sales force throughout the industry. "A rack salesman will rarely experience the same sales opportunity twice," Camberg explains. "Every time [a salesperson] visits a customer to identify his requirements, [that salesperson] will have a new, different set of challenges. A good rack salesman must be flexible and a good problem-solver." Camberg also emphasizes the importance of training. "We train our sales force to offer CAD drawings and technical assistance in order to

Interlake Mecalux has taken the global population's crisis mindset as a decisive moment to grow and expand.

only, most customers tend to buy rack that matches what they already have, so getting there first will help future sales although it certainly won't guarantee them. A company with Interlake Mecalux in its warehouse will likely lean toward using that company again in the future, but one cannot assume that it will always work out that way. The big opportunities when selling rack, be-

John D. Rockefeller said, "The secret of success is to do the common things uncommonly well." Success, in the material handling industry, is measured in minute increments, with no margin for error. Since rack is not a consumable product, getting a foot in the door is crucial for two reasons: first, once you fill a warehouse with rack, nothing is likely to change in that space for up to a decade. Sec-

Top: Fotohunter/Shutterstock Bottom: Wrangler/Shutterstock



earn our customer's trust and loyalty." All of this, of course, is saddled on the backs of each salesperson's repoire with clients, knowledge of product as well as its collective technical and organizational skill set. Selling the rack is just one step of the process, and while price is definitely important, this business is all about execution. "Once you get an order, you have to manufacture it correctly and ship it on time, that creates happy customers," Rossmiller explains. "If you become known as a company that does these two things well, customers will seek you out."

Warehouse construction is a process that has to be finely synchronized. The Interlake Mecalux installation team is in charge of acquiring every component needed for the installation of the rack, arranging the procurement of permits and coordinating inspections prior to starting the construction. That includes purchasing material not manufactured by Interlake Mecalux for turnkey delivery, like rail-

ings or stairs. Installation coordinators select qualified contractors and negotiate and control contractors' extras. They make sure all site deliveries are made on time and each phase of the project is completed on time.

to make sure everyone is getting their piece of the puzzle positioned correctly and on time. Completing projects promptly and of the highest quality required of Interlake Mecalux is the main responsibility of the Project Manager.

Facing fierce competition, Interlake Mecalux has increased its market share in North America from 20 percent in 2010 to 33 percent in 2011.

The driving force behind any installation is the Project Manager (PM). The PMs, highly qualified associates within the company, oversee the construction project from beginning to end and are studied in specific clients or certain products. They have to understand every facet of the warehouse building process. From rack components to lighting fixtures, floors to fire suppression systems, the PM has

Warehouse installations are a combination of many moving elements. Making those elements fit properly creates a high quality, state-of-the-art storage space that will provide invaluable organization and productivity for any company for years to come. Smooth seas do not make skillful sailors, which is why any good sales force prepares for crisis; sails unfurled, all hands on deck, solutions at the ready. 



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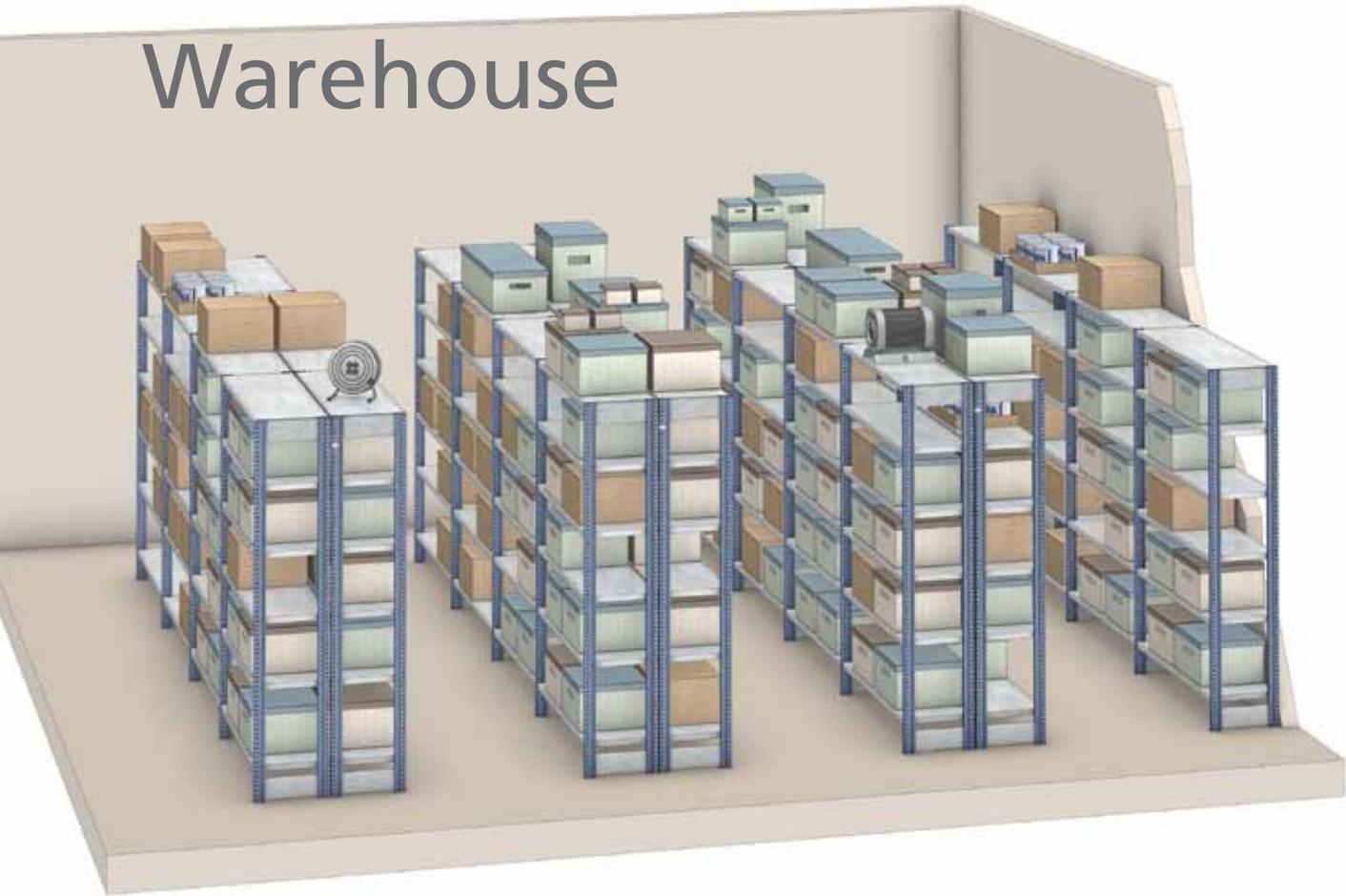
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The Well- Slotted Warehouse



By Marta Jimenez-Lutter

How a highly organized storage facility can save money and time in a difficult economy.

Order picking can be the most labor-intensive and costly activity in a warehouse. The average full-time warehouse worker spends between 50 and 60 percent of his time traveling to retrieve SKUs. Personnel travel represents an obvious waste of time and money for any storage facility. The best way to address this issue is slotting references properly. Slotting consists of determining the most appropriate storage location for every product in a distribution center. The goal is to create the most highly efficient system where items are retrieved quickly, accurately and safely. Each design configuration de-

pends on the facility's products, traffic and storage properties.

We do slotting in our lives all the time. Construction workers do not throw their tools loosely in a bag, they use a compartmentalized bag to separate screwdrivers from hammers and other gadgets, so they can easily access them. We slot our kitchens, placing everyday items in the most accessible spots in our cabinets. Warehouse storage spaces are no different. With hundreds of SKUs, it is imperative to know where everything is and have access to it in a timely manner.



The varied nature of products stored in warehouses makes slotting a complex process. The dimensions of the items stored and any special characteristics (cold storage or hazardous materials for example) have to be taken into account. Weight and height also play a role in how and where items should be placed.

The configuration of the installed rack has a big role in the slotting process. If a warehouse is storing outdoor equipment, for example, such as skis and camping gear, they will need to deter-

mine where to store each one in order to access them easily during their high seasons; spring and summer for camping and fall and winter for skiing. The difference in dimensions and configurations of these products will have to be considered when selecting the rack. In this case, a

cantilever rack, with its extensive range of load capabilities and adjustable arms, offers the greatest versatility and will accommodate camping tents or skis. This way, the product will change seasonally, while the rack stays in place in the most convenient location.

Placement Rules

A well-organized warehouse with the highest picked items in the most accessible areas, stored in the right rack system, will save money in labor, space utilization and inventory control. The economic benefits of a well-sorted warehouse have helped warehouse owners and facility managers recognize slotting as an often misunderstood and overlooked building block of warehouse optimization. It is indeed a very important component of storage design, and although there is not a one-size-fits-all method, there are some basic rules and considerations that make the process easier and more effective.

Some of the rules include placing fast moving items close to the shipping docks and storing items with slower turnover further away from the loading area and on higher levels. Taller and heavier cases should be placed at the beginning of the pick path in the picking areas, while the faster moving cases would be better stored at floor level. Again, everything is relative to a specific facility's layout and schedule, but patterns emerge that may be helpful to acknowledge when deter-

With hundreds of SKUs, it is imperative to know where everything is and have access to it in a timely manner.

The first step to completing a slotting project is determining traffic flow and allocation of SKUs.

mining the effectiveness of a space's slotting area (generally considered the space reserved for forward picking) and zoning (the area in which reserve inventory used to be picked in full pallets or used to replenish forward pick area is held).

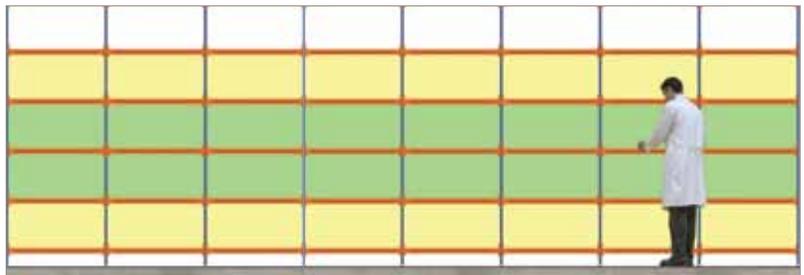
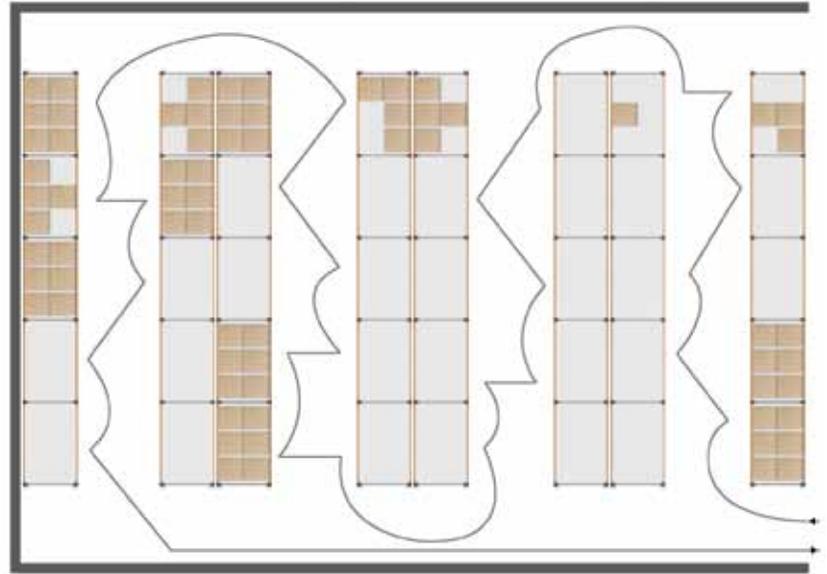
When storing items in carton flow rack, positioning the fastest products on the center level and balancing the workload among the flow rack units will prevent congestion during retrieval and speed up the picking process.

Slow moving items can be placed on standard rack, while the fastest ones can be closer to the conveyor belt. It is always important to balance the loads, with the heavier items on the center levels.

Step up the Organization Process

The first step to completing a slotting project is determining traffic flow and allocation of SKUs. A warehouse management system (WMS) can help with this task by defining what items are retrieved most frequently and establishing a ranking system. An ABC classification is used by most distribution centers, with "A" being the fastest moving items and "C" being the slowest.

Once the hierarchy of products is established, the next step is to puzzle out the best location for those items. A com-



(TOP) A typical example of the inefficient footprint a poorly slotted warehouse may cause.

(BOTTOM) Vertical slotting is important, too. The higher turnover items should be placed in the green "sweetspot".

mon practice is to place the "A" items in the center levels of the flow rack, also called the "golden" zone, which is situated between chest and waist height, at an easy ergonomic level for the workers. This placement makes the retrieval of SKUs easier and safer.

Once the particulars of the items to be stored are sorted out, an implementation system has to be created. A well-developed WMS, such as EasyWMS from Mecalux, can make the execution of the process easier by performing calculations of the rotation of each item at intervals deter-

mined by the user. The program can also generate reports suggesting changes in the rotation of references and provide images of the warehouse with the exact location of references.

A storage facility is an evolving organism and as such, it needs to be slotted and reorganized periodically. A study by the Insight Group showed that slotting every three to six months can increase efficiency 7 to 15 percent more than doing it once a year or less. Logical times to do this during the year would be at the beginning and end of each season (understanding this as



summer, holidays, winter, etc.) or before and after promotions, when inventory needs and quantities change and shift.

Since warehouses are as varied as the products they store, each facility will have to adjust to its particular market fluctuations. A food storage facility will experience more demand of turkeys or hams, for example, during Thanksgiving and Easter, so they will stock up on those items and put them in the most accessible area of

their cold storage units. A beverage distributor would benefit from keeping sparkling wine and champagne stocked in greater quantities in easy to pick areas for a couple of months leading to New Year, while that preferential space will be better utilized to store beer and soda in the summer months.

Smaller products that are rarely ordered in bulk, can be placed in the picking area in vertical lift module, which of-

ten have easy retrieval systems that don't require traveling time around the warehouse.

No matter the warehouse, slotting is as much of a necessity as an organized garage or a fridge with easy access to the beer. And much like the shelves in the fridge or the pegboard hanging the tools, the right warehouse system and WMS make slotting easier and maximizes any company's resources. 

Product Spotlight: Cantilevers

From architecture to aviation, cantilevers are ideal for warehouse applications.

by Dave Batka

Selective shelving can transform a warehouse's efficiency and adapt to nearly any floorplan layout, but there are instances in which a unique storage system is the most appropriate. In instances of oddly-shaped goods in need of storage, structural cantilever shelving provides a unique alternative to traditional flat-bottom storage.

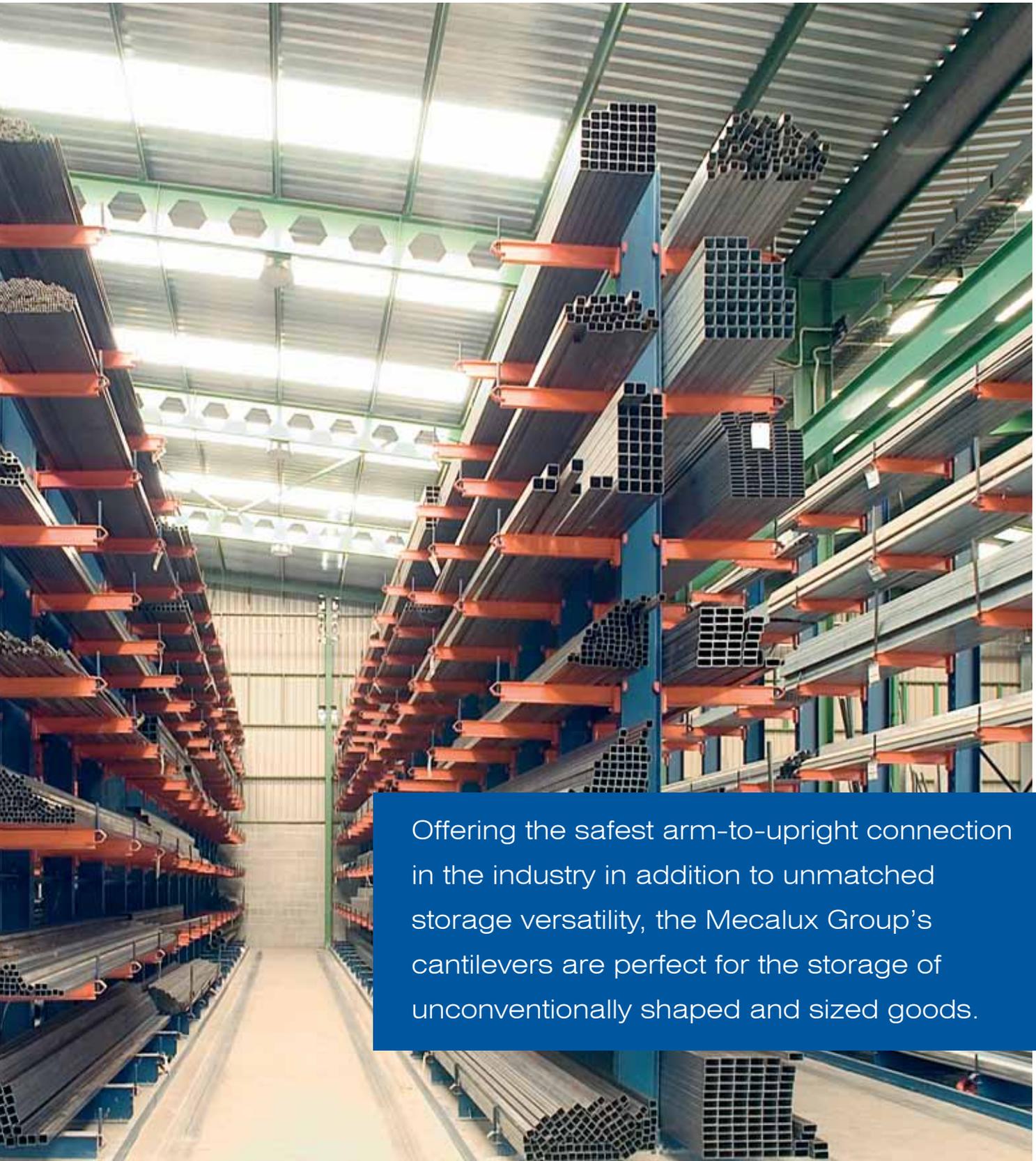
While cantilevers have been most notably used in architectural structuring, most famously in Frank Lloyd Wright's Fallingwater project and WWII fighter planes, their simple construction and practicality make them ideal for optimizing storage space when large or bulky items are being handled. Interlake Mecalux engineer Greg Hajdus said, "Cantilevers are best applied everywhere where the storage of long pieces are needed, such as timber, pipes and sheet metal. They are ideal

for very long loads of unequal size." Cantilevers function through a beam anchored at one end, which carries the load to support the extended structure. This allows for overhang without external bracing.

The Mecalux Group's roll formed and structural cantilevers offer economical designs to suit numerous applications and are ideal when trying to maximize the storage of non-palletized and sheet-type items. Cantilever rack also provides operators easy access to product SKUs through its efficient and sturdy arm construction. Also, since there are no uprights in the aisle, rack stability is greatly increased since forklift operators cannot knock into a main support.

The rack's versatility truly makes them ideal. Mecalux cantilever arms are adjustable in 4 inch (10.2 cm) increments on structural models and 3 inch (7.6





Offering the safest arm-to-upright connection in the industry in addition to unmatched storage versatility, the Mecalux Group's cantilevers are perfect for the storage of unconventionally shaped and sized goods.



CANTILEVER BENEFITS

- Large range of load capacities
- Unlimited horizontal space
- Unobstructed accessibility
- Economical
- Adjustable arms to accommodate a wide variety of products
- Adjustable arms

cm) increments on rolled-form ones, allowing for storage of almost any conceivable item. The accessories offered for cantilevers further heighten their versatility and the accessibility of stored products. Drop-in steel decks can be added, and arm stops and saddles for deck supports can also be installed, increasing the safety and protection of both the product and rack system by preventing products like timber and pipe from rolling off the arms. Cantilevers can also be mounted on to mobile systems for extra storage capacity without limiting direct access to each load stored.

The cantilever's patented Lok-Joint system

is the strongest and safest arm-locking method in the industry, drawing together the most secure connection available and

maximizing total capacity. The locking system engages immediately once an arm is seated within the slot of the upright post but also allows for easy release if adjustments need to be made. The Lok-Joint system's design also makes it damage-proof and tamper-proof, preventing disengagement during use.

Interlake Mecalux roll-formed and structural cantilevers can also be utilized in storage situations where seismic conditions need to be addressed.

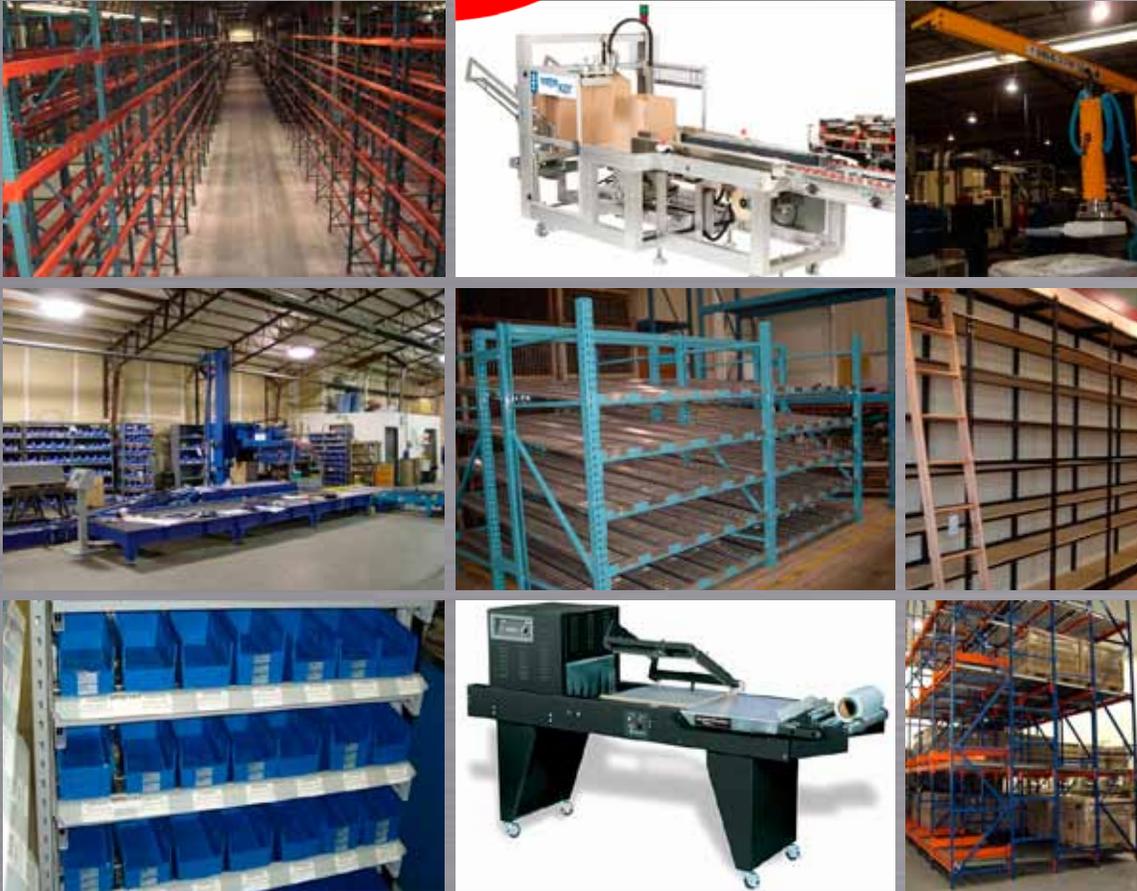
For longevity, the Mecalux Group's cantilevers are powder coated to ensure their

aesthetic appearance will withstand the daily wear and tear of loading and unloading, while also allowing them to be displayed in consumer settings. The powder Mecalux uses in its paint process is a mixture of finely ground particles of pigment and resin. Once pieces are coated, they are heated, fusing the paint particles together in a uniform coating. This results in an extremely durable product. And since no solvents are used in the process, insignificant amounts of VOCs are released into the atmosphere.

Safety and reliability are two key requirements that should be considered when designing a storage system, and Mecalux cantilevers are not to be undone. Offering the safest arm-to-upright connection in the industry in addition to unmatched storage versatility, the Mecalux Group's cantilevers are perfect for the storage of unconventionally shaped and sized goods. 



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