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Save Time Money With New Shipping Methods

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Improving your end-of-the-line shipping functions such as palletizing and unitizing can send money straight to the bank. Keep in mind, it's always about material flow.

Probably the most expensive, least efficient way to palletize or unitize a load is to do it manually. Yet it's the way many companies first approach the challenge of shipping product. Consider the fact that you're only renting a laborer's services and rental costs keep climbing. In addition to the cost of renting the labor, medical expenses have skyrocketed. The U.S. Department of Labor reports that in 2001 nearly 400,000 back injury claims were filed. Add in workers' compensation claims and U.S. industry is paying out an estimated \$20 billion in indirect costs for producing its goods. And while we might be able to figure the cost of vacation time away from the job, things like coffee breaks or tardy employees add an indeterminate amount to the growing financial burden.

There is a better way. First, let's define what it is we're talking about. Although palletize and unitize are often used as synonyms, there is a difference. By most industry definitions, unitizing means to consolidate packages into a single unit with banding, wrapping material or binding in some manner. To palletize means to place packages or material on a shipping platform in a prescribed manner, arrangement or pattern.

Improper definition has caused plenty of sleepless nights of late among retail product shippers. The Wal-Mart mandate requiring a radio frequency identification (RFID) tag on pallets created the challenge of how to attach a tag so it won't be damaged. Chep, a pallet leasing company (Orlando), and others, established elaborate programs in test facilities to find the proper place for the tag. As it turns out, what Wal-Mart is really asking for is a tag on the *unitload*. As Ralph Rupert, packaging engineer at the Center for Unit Load Design (Blacksbury, Va.) says, "Putting an RFID tag on a pallet is like attaching a license plate to car in a demolition derby!"

Efficiency by design

Your palletizing product choices range from doing it manually to various state-of-the-art technology. Let's start at the beginning with finding an arrangement for the products on the pallet.

Experienced distribution center employees might know exactly the best pattern for arranging containers on a pallet. Experienced employees, however, don't usually have manual labor jobs. Many companies are investing in software that designs an arrangement for virtually any grouping of objects in the most efficient layout for the pallet or truck trailer. This virtual brain power can be downloaded to the controls of automated palletizers or made to print diagram sheets for manual palletizing. Getting more containers onto a pallet by changing the configuration can save you

money and reduce product damage.

Sometimes selecting pallet-building software can be based on customer service needs. Joe Puglia, director of operations, Schenck Company, a specialty beer distributor in Orlando, says he had a variety of issues such as labor turnover and a constant need to educate his case pickers in the distribution center.

"We have a lot of customer requirements, including the use of special pallet sizes," he says. "And we often need to stack the load in customer specific ways, such as putting six-packs that need scanning on the top of the load, etc."

Schenck's customers range from mom-and-pop corner stores to Disney. The company opted to install AutoPalletP3, designed about 10 years ago for Proctor and Gamble by Warehouse Optimization (Franklin, Tenn.). AutoPalletP3 mimics the tasks of an order picker. It uses 20 rules to manage items such as stacking preferences—stronger cases on the bottom—for example.

"Essentially," says Puglia, "the software does the thinking for the order picker. It designs the pallet the way the customer wants it. It also guides the picker around the warehouse for an efficient route that creates a stable, damage-free stack."

He adds there are some learning-curve problems with people new to the job, however, the education process goes much faster and people are up to speed in just a few days. The software is viewed as a productivity tool as well as a way to give individual customers what they want.

Choosing a palletizer

Palletizers have been around for nearly 100 years. Depending on the level of flexibility required by your manufacturing or distribution operations, and your product variation, automated robotic and gantry palletizers can be configured and integrated into your process.

Paul Probst of vonGal, a division of HK Systems, says even though palletizers have been around for a long time, customers continue to find new applications and want specialty machines. "The reason for buying is still the same," says Probst, "to optimize throughput whether they're palletizing 15 or 220 cartons per minute."

The newest offering from this company well known for its gantry style machines, is a palletizing robot called the VK180PA.

"This is an enhanced robot," explains Probst, "that offers flexibility in diverse environments."

The machine features a carbon fiber arm and is RFID enabled. Depending on which end effector you chose, the machine can lift and move bags, drums or cartons. A special version is designed to work in temperatures of minus 22° F.

"The machine was developed to work in high-speed applications," says Probst, "with payloads as much as 400 pounds."

If the product being palletized is lightweight or fragile, special handling is needed to orient the carton. That was the impetus for FKI Logistex Alvey's bumpless case turner.

"By eliminating the bump-turning impact of conventional case-turning methods," says Ken Thouvenot, vice president of project management, "we've provided a solution for bottles, paper products or food products, anything that requires specialized handling."

The bumpless case turning feature is actually an upgrade that can be applied to many Alvey palletizer models. It uses a specialized technology to create a speed differential under cases that can selectively and accurately generate negative 90-, positive 90-, 180- and 270-degree case turns.

"A number of industries," explains Thouvenot, "require label-out or bar code-out case turning for retail display, especially for the bigbox stores."

The system has an auto-correct function using two laser sensors to ensure accurate case turning.

How to keep it all together

Containing and unitizing a load, be it 50 footballs or a single refrigerator has always been a challenge. Responding to the needs of its retail customers, Lantech has developed a stretchwrap machine it calls a containment method, that will physically lock a load onto a pallet.

"Based on what we've seen and heard from customers," says Bill Caudill, product manager for automated systems, "typically when a load is wrapped to the pallet, lift truck tines will cut the wrap and the load is loose."

Rupert at the Center for Unit Load design confirms this. "We see people wrapping the load with several wraps at the bottom, then the top and the bottom again. This does not give the load stability at the top where it's needed. And as soon as the tines puncture the wrap, the load is free to shift."

Rupert adds that stretch film is a fair horizontal stabilizer, however it does nothing for vertical movement, which is where the real damage occurs. "It's trailer vibration that causes the most problems and movement," he explains. "Often the [incorrect type of] pallet acts like a trampoline and the loads bounce all over the trailer."

Lantech's solution to the ripped wrap problem was to find a way to attach a load to the pallet with bottom wraps of film that have been twisted in a cable along the lower four to six inches of the web. This tightly wound cable is wrapped with 50% higher wrap force as it is secured below the deck of the pallet. Meanwhile, the remaining film web stays above the deck and secures the load. Pallet-Grip wrapping (Lantech's name for this process) leaves the lift truck tine entry points open.

The difference between this approach and other "roper" type applications is that Pallet-Grip does not just create a bunched-film rope that might unravel and require staples, heat sealing or other ties to maintain tension. It performs more like a wire reinforcement in the bottom edge of the film web.

Just as important as throughput when buying a palletizer, floor space and time also figure big into unitizing decisions.

"As we talk with customers," says Pete Vilardi, marketing manager at Orion Packaging Systems, "we find they understand the benefits of throughput well enough. The concerns we're hearing now are about limited floor space in the distribution center and keeping people busy." Keeping people busy can mean creating machines that allow the lift truck operator to start a wrapping procedure without exiting the truck, and figuring a way to better use the load wrapper's time.

For example, Vilardi says Orion has introduced its automatic film replacement device that allows a stretch-wrap system to automatically discard an empty film core, then load a fresh roll of stretch film.

"Of course," explains Vilardi, "it depends on the user's production schedule, but we've seen companies run an entire shift without the need for operator intervention to change rolls."

The system works by having a carousel with six rolls of film placed on spindles. As an empty roll core is discarded from the carriage, the carousel rotates and a new film roll is lifted off and onto the carriage.

"We've installed a sensor device on the system," says Vilardi, "that can be adjusted to deal with removal and replacement of less than fully loaded, or even damaged rolls in the event of a film break."

Solving slippery problems with tack

Unlike pallet shipments of heavy case goods, which have solid case-top to case-bottom contact, stretch-wrapped trays of bottled water only have contact at the bottle top. This limited contact, combined with the slippery nature of film, requires the use of tier sheets and multiple layers of stretch wrap.

Ulf Strehl, maintenance manager, Ice River Springs, says "The use of tier sheets and lots of stretch wrap is fairly standard in the industry. It's expensive and considering that pallets use from four to 10 layers, we had added complexity on the production side."

The solution to Strehl's problem was a water-based, easy-release stabilizing adhesive, specifically formulated for shrink film, as well as regular and woven polypropylene bags.

Available from Lock n' Pop (Lynnwood, Wash.), the product has shear strength high enough to ensure that tray packs don't shift during palletizing, in-house handling or shipment. It can reduce, or often eliminate, the need for stretch wrap, corner boards, tier sheets or dunnage. Lock n' Pop adhesives have low-fracture tensile strength to let individual packages snap apart when they are removed from the pallet. It also maintains the integrity of partial pallets when stretch film is removed.

Strehl says the application process runs on plant's compressed air system. "Since the adhesive is water-based and non-toxic, it is essentially maintenance free," he says.

An array of spray heads are mounted at the end of a shrink tunnel. These heads place a 1/16-in. bead across points of contact, in this case bottle caps. Products on the line move up to 30 cases per minute and range from 250 ml bottles at 10 layers per pallet, to 1.5 liter bottles at 4 layers per pallet.

Within two days of installation, Strehl noticed improvements in warehouse handling of unit loads and over-the-road shipments. Drivers and customers reported perfect stacks. In addition, the use of the adhesive eliminated the need for tier sheets. This resulted in a significant cost savings for Ice River and reduced disposal costs for its customers.

Strehl says an unexpected benefit was that it was able reduce the amount of stretch wrap required for stabilization.

High-tech solutions

At the other end of the technology spectrum is a new, multi-million dollar robotics system for the U.S. Postal Service from ABB Robotics. This new system is part of a continuing program to improve customer service.

"We've worked with USPS nearly 10 years," says Dinesh Paliwal, head of ABB's automation technologies division, "to develop solutions that meet their needs in software, automation and service."

"Substantial time and effort is associated with verifying, lifting, stacking pushing, unloading and re-verifying trays of mail across our processing operations," says Tom Day, USPS vice president of engineering. "These [automated] systems enhance our automation program by applying the flexibility and modular design of ABB's gantry solution to complete the automation of tray handling requirements."

The containerization system performs the tasks of handling several million items of mail every day. When completed, there will be 67 systems installed, each with two robots to automatically sort, move and stack mail trays based on ZIP code information embedded in bar codes on the containers.

If your looking for a low-cost way to unitize large, flat products, a new load carrier, called the OptiLedge system offers unparalleled versatility. The Optiledge is easily adapted to different applications.

These kinds of products are not going to change the world's use of pallets. They will, however, continue to fill needs in niche markets.

"Now," says Gary Garkowski of OptiLogistics (Irving, Texas), "the demands of the product and supply chain, not the dimensions of the pallet or other unit load platform, will determine the size of the unit load. It will be the product that dictates how it's handled, transported and stored."

Wrapping it up

Most statistics indicate there is trend toward more unitizing and palletizing of loads between manufacturers and distribution centers. Ten years ago, when pallets where considered evil, there was a movement away from palletizing. The reality is the unit load is still the most efficient way to move large quantities of products with minimal damage. In the U.S. our distribution systems are designed around the unit load, except in cases where cross docking is used. Even then, unit loads are often delivered and disassembled for distribution.

The reason unitizing and palletizing will continue to flourish is because, as consumers, we are obsessed with having choices. Product proliferation means more units, in more configurations for the retailers to deal with. Another reason for increased product proliferation is because manufacturers, faced with demands from mega retailers to reduce prices, need to find a way around those demands. Manufacturers do this by making minimal changes to the packaging, contents or sizes of their products so they can claim to the retailer that the product is new and improved. Thus, the price cannot be reduced. For material handling, this tactic will mean increased handling of more stock keeping units. Probably the best example of this marketingdriven tactic is toothpaste. All those varieties mean more palletizing, unitizing and more material handling.

RFID and unitization will only become a major story when standards such as communication frequencies or tag locations are established within the RFID community. Until then, the slap-and-ship method of printing a tag and sticking it on the unit load will be the norm.

According to Rupert at the Center for Unit Load Design, the issue to keep your eye on in palletization is the phytosanitary challenge. As more companies become international shippers, demands will be made for more stringent controls on kinds of wood or alternative material in pallets. This could dictate how your goods are stored and shipped going to Europe or Asia - or received from those regions.

In the U.S. the 48x40 pallet, or GMA, has long been thought of as the standard, yet it makes up only 35 percent of the market. Now we're seeing demands from Europe for the Euro size, and from

Korea for the Pacific Rim size. It's a global issue that is just beginning to heat up.

Pallets and sizes of unit loads have long been dictated by the marketing department of companies; often by people with no idea of the perils of the distribution network.

Rupert says he is beginning to see some movement toward a better understanding of the entire distribution environment as part of the palletizing and unitizing decisions. As retailers get larger and dictate packaging requirements, defacto standards are certain to appear.

There is also some movement toward designing products with distribution in mind. In Japan, scientists have developed a square watermelon because it fits more efficiently into a refrigerator. That's progress.



The bumpless turn feature can be added to existing palletizers as a way to handle products in a more gentle manner.



Stacked and wrapped loads are first stabilized with the application of an easy-release stabilizing adhesive.



Film has been twisted into a cable along the lower four to six inches of the film web to secure the load and cannot be damaged by lift truck tines.



Six rolls of film can be indexed onto one machine and automatically changed, reducing the need to keep the machine monitored by an employee.



Trays of mail, after being sorted, are stacked on pallets for unitization and shipment.


For More Information ...

If you would like more information on the subjects covered in this article, contact any of the following sources:

- ABB Robotics, www.abb.com
- CapeSystems, www.capesystems.com
- Center for Unit Load Design, www.unitload.vt.edu
- FKI Logistex, www.Fkilogistex.com
- HK Systems, www.hksystems.com
- Lantech, www.lantech.com
- Lock 'N Pop, www.locknpop.com
- OptiLogistics, www.optilogistics.com
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