

The elephant in the warehouse



The huge issue of how to best store and handle bulky, heavy items often vexes DCs. The answer may lie in a building's height rather than footprint.

By Sara Pearson Specter, Editor at Large

Where does an elephant store itself in a warehouse? Wherever it wants. And that's exactly the problem with storing large parts in most DCs. They tend to wind up in some really awkward places.

Worse yet, we're talking really large parts here. They include heavy, bulky stock keeping units (SKUs) such as automotive bodies, furniture, cylinders, carpet and appliances that don't fit on a standard 48 x 40 inch pallet and cause so many handling headaches.

ILLUSTRATION BY DANIEL GUICERIA

“While it’s not unusual for oversized parts to only represent 10 to 15% of a total company’s product cartons, they can represent anywhere from 40 to 80% of the cube that they actually ship,” explains Jim Sapienza, facilities design manager for Interlake Material Handling (630-245-8800; www.interlake.com).

Facility managers have tiptoed around the issue for years, wasting valuable square footage by storing these space pachyderms in wide open expanses on the warehouse floor. But cost pressures felt in all industries by both manufacturers and distributors are forcing companies to find better, more cost-effective storage solutions.

“More people are trying to go vertical with large bulky parts because they have to,” Sapienza adds. “New construction and building costs have gone

DC implements high-volume AS/RS

Michigan retailer Art Van Furniture’s 30 showrooms do not carry inventory. To quickly and efficiently process customer orders at the company’s central DC, an integrated automated storage system was installed. By opting to store items vertically in a high-rise automated storage and retrieval system (AS/RS) (Dematic, 616-913-7700, www.dematic.us.com), Art Van avoided maxing out its current site.

Heavy and bulky sofas, chairs, kitchen furniture, bedroom furniture and home accessories are stored in the AS/RS. Standing at 105 feet tall and 395 feet long with four access aisles between the rack-supported structures, the system stores up to 10,008 four-foot by eight-foot pallets. Pallet loads weigh up to 2,000 pounds.

The system offers fast, accurate inventory control in a compact space while giving better information about the goods on hand. With approximately 100 picks per hour, throughput now stays ahead of store delivery requirements. The AS/RS can also be operated with just four people per shift in either receiving or shipping.

Heavy-duty powered roller conveyor works with chain conveyor to route furniture on pallets as it leaves the AS/RS.



up considerably in the last three to four years. So there's a movement—still in its infancy—to use the height of a building for vertical storage of large bulky items, rather than the footprint.”

Analyze the problem

The first step to figuring out how best to store large parts vertically is to analyze the items themselves, says Steven Bell, director of engineering for the FA/DA division of Daifuku America (801-359-9900; www.daifukuamerica.com).

“The most important item is to define the load and work the rest of the system around that,” he says. “The load is the fundamental building block. If the load is defined incorrectly, every part of the handling system will be incorrect.”

As with most materials handling challenges, to automate or not to automate is the question. But Bell points

out, “most times it is not a matter of parts, but rather it's a matter of justification. It's important to identify where automation will improve operations and generate payback.”

Sapienza agrees. “The longer, the deeper, the more specialized the equipment—and the more the pallet quality and special handling considerations and specialty equipment come in—then the cost of handling and the cost of the investment gets to the point where you might as well just go and pave some more concrete and put it on the floor,” he says.

Another important factor is the facility's role in the supply chain. Manufacturers generally don't handle a lot of different SKUs, so specialized equipment, like custom racking or automated handling, might be the most cost-effective solution.

Conversely, for retailers, wholesalers or third-party logistics providers

(3PLs) handling a variety of large part sizes, it might make more sense to use standard racking but develop a special pallet to accommodate the larger items.

Finally, says Bell, when handling larger, bulkier items, distribution centers need to take into account ergonomic analysis and time studies. Large part storage handling can take more time, more room and more effort to move material.

Doing that efficiently requires matching the parts to various types of materials handling equipment. In addition, a warehouse management system (WMS) may be needed to maximize productivity (see box on the next page.)

Racking systems

The storage and handling of large parts can be accomplished rather easily and economically by using conven-

WMS helps DC increase shipping and receiving by 10%

From an 860,000-square-foot DC in Salt Lake City, RC Willey receives and ships 3.1 million furniture, appliances, and electronics items a year to stores in Las Vegas, Boise, and Salt Lake City. The facility also serves customers who pick up their items on-site. To improve productivity and delivery accuracy, the company moved from manual receiving, picking and unpicking to a more automated operation with a warehouse management system (WMS) (Daifuku America, 800-253-1003, www.daifukuamerica.com).

Before implementing the WMS, daily pick tags were printed and operators sorted the tags however they felt was most efficient. Merchandise was tracked at the stock keeping unit level. That worked when items were received, stored, picked and shipped, but not for undeliverable or replaced items in an order. Fourth-quarter high volumes amplified the problems.

With the automated system, the WMS directs storage locations. As the orders are placed, the WMS directs the pickers to the items needed in each aisle. Today, RC Willey consistently exceeds its goal of a 10% increase in receiving/shipping items each month. Inventory/shipping accuracy is virtually 100%.



RC Willey's Salt Lake City DC moves items individually.

tional types of storage racking systems with simple modifications, says Tim Bastic, vice president of Integrated Systems Group, a division of Speedrack Products Group (616-887-0002; www.integratedsysgroup.com).

Conventional rack storage systems for large parts include selective pallet racking and cantilevered type racking systems. The two differ in the available depth of the racking systems. They also differ in the length of load beams for selective pallet racking systems and the size and type of decked cantilevered racking.

“Cantilevered racking is used for long, bulky type parts that are not con-

ductive to storage in selective racking, due to the vertical obstruction of the typical racking uprights, being on eight-foot, nine-foot and 10-foot centers," Bastic says. "Selective racking can be designed to accommodate long, deep parts, where product is loaded in a front to rear orientation, similar to a carpet-type rack."

Bastic notes that there is typically a cost advantage to selective racking versus cantilevered racking. That is due to the large amount of steel content in cantilevered racking, yielding approximately a 25 to 30% savings per like item stored, says Bastic.

Automated handling

On the automated side of bulky item storage, automated storage and retrieval systems (AS/RS) offer a multitude of configurations to handle large and oversized capacity.

"For large part handling, the

mechanical elements of the system design are up-scaled to accommodate the size and weight of the loads," says Ken Ruehrdanz, business development manager at Dematic (877-725-7500; www.dematic.us). "The input/output conveyor network, rack structure, AS/RS loading device, and the S/R machine are all super-sized with larger motors, more substantial rack structure, and extended load handling devices."

In addition to AS/RS, suppliers are also working to develop automated vertical lift module (VLM) and vertical carousel (VC) storage systems large and nimble enough to handle oversized parts, says Larry Strayhorn, president of Diamond Phoenix (888-233-6796; www.diamondphoenix.com).

For instance, VLMs designed for large parts store very large width and depth items like molds, fixtures, or sheet steel weighing more than 7,000

pounds. They also feature front or side discharge areas to allow for more flexibility. Some VCs hold items up to 60 inches in diameter and 46 feet long, including cylinders and rolls.

Supporting equipment

Whether large parts are stored in racking or in an automated storage system, they still have to interface with other equipment to be moved into or out of the facility.

Supporting players to help with the movement and storage of these items include fork trucks equipped with various attachments, including clamps or mandrels for handling different types of rolled or cylindrical materials.

Vacuum lifters help with the transfer of sheet-type items. And, in instances where the floor is truly the only cost-effective way to store large parts, overhead bridge cranes do the heavy lifting.