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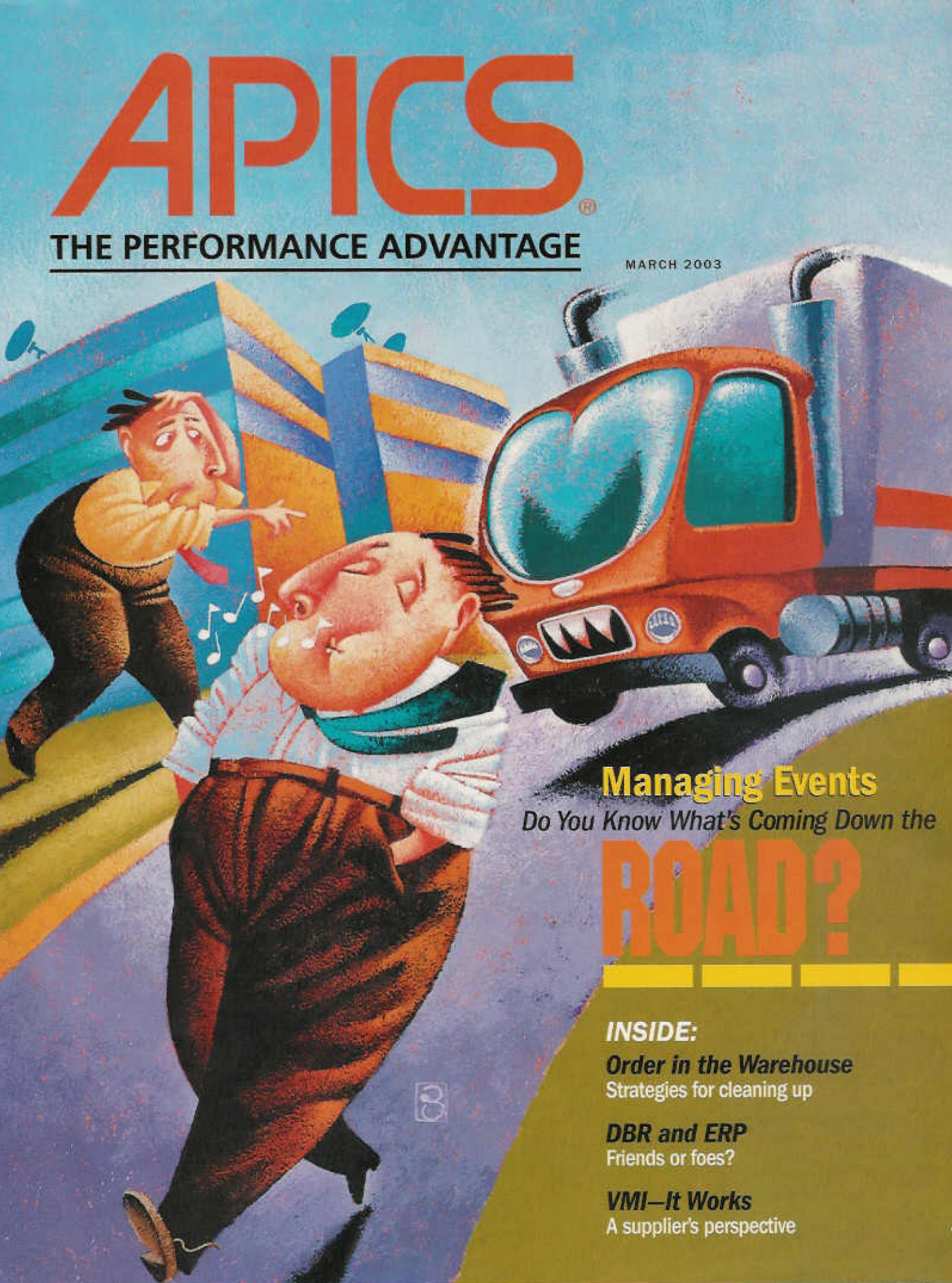

Managing Events

Do You Know What's Coming Down the

ROAD?

INSIDE:

Order in the Warehouse
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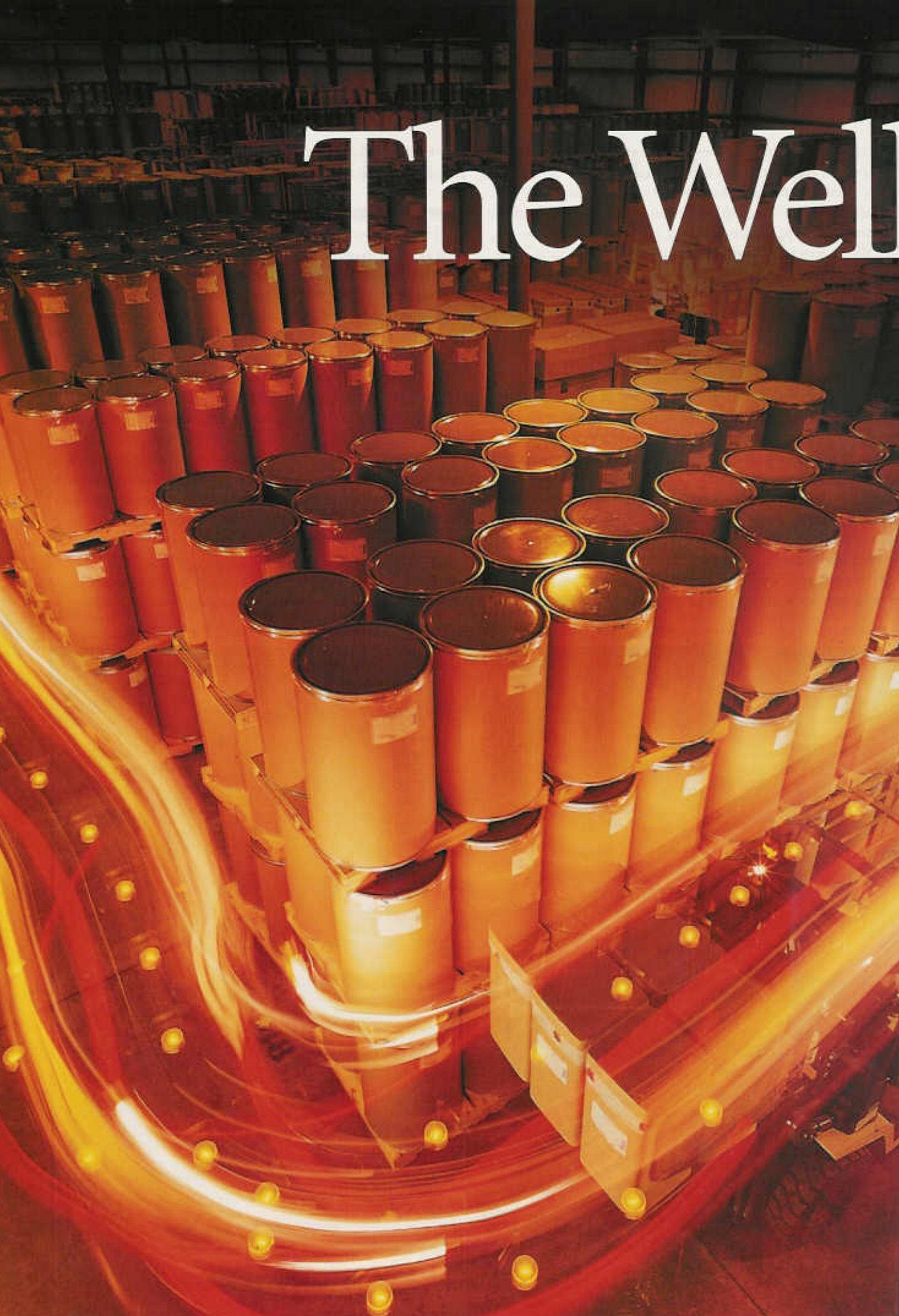
The Well

Ordered WAREHOUSE

BY **MICAH R. KEE**

How to optimize warehouse operations, and what to look for if you're out shopping.

The building looked great: 100,000 square feet, rectangular, plenty of clear height, and consistent column spacing. The operation inside the building, however, indicated chaos. Not only was the racking coming down to make room for more floor storage two pallets high and 24 pallets deep, but the broken stack loss—in the form of partially filled rows—was a result of turning the center only four times a year. Further, since the distribution center shipped many single-case orders, there were broken pallets sitting in storage rows and aisles throughout the facility. And since the building was full, finished product had to be stored in the grass along the side of the building and in the parking lot. This chaos resulted in significant money spent leasing outside storage space at premium rates.

To better understand how to take control of a warehouse operation, many begin by reviewing basic data on the warehouse and its operations. While this is important, it is also imperative to review the following practices: ABCD classification, forward picking, dual tasking, double-wide/double-high handling, storage, lot control, and contract packaging requirements. Implementing these seven practices can deliver real savings in this situation, and the result will be smoother warehouse operations and tangible savings.

At-a-Glance

- Cleaning up chaotic warehouse operations can increase productivity, concentrate storage space, and reduce labor expenses.
- Seven common practices such as ABCD classification and forward picking can help you get warehouse operations under control.
- Implementing these seven practices requires accumulating some basic data—from general warehouse operations, from the last physical inventory, and from the order profile.
- When choosing new warehouse space, focus on building shape, clear height, floor capability, column spacing, and non-storage areas.

ABCD classification

ONE OF THE MOST COMMON pitfalls in warehouse operations is excessive travel distance between the docks and the location of the most popular products. Items in the warehouse should be classified into four categories (A through D), based on the percentage of plant or warehouse volume they represent. Class A items typically constitute the 20 percent of total stockkeeping units (SKUs) that make up 80 percent of the plant or warehouse's total annual volume.

Class A items should be stored closest to the dock doors to minimize total travel distance for the most popular products received and shipped. The remaining 80 percent of the SKUs, comprising only 20 percent of the volume, should be placed in less ideal locations. Class D items are those SKUs having no sales or shipment activity during the past 12 months.

ABCD classification enables optimization of the material handling operations in any company and directly affects the bottom line through reductions in staffing, fuel, and equipment maintenance.

Forward picking

COMPANIES THAT HAVE A large number of SKUs and a small number of pieces, units per pick, or order line items are good candidates for forward picking. Forward picking reduces travel distances and the time required for shipping operations by grouping individual orders together into picking waves. A picking wave is comprised of all orders requiring shipment within a predetermined period of time, typically between 4 and 24 hours. This grouping generates a master pick list (MPL) that summarizes, by SKU, the entire picking requirements for the time period. The MPL enables lift truck operators to

pick full pallet quantities to a central forward pick location closest to the shipping dock doors.

Piece-pick travel is now concentrated in one central area closest to outbound trailers. Partial pallets are now in one concentrated location instead of scattered throughout the warehouse. Staffing requirements are now more easily determined. Forward picking maximizes efficiency through both proper pallet placement and staffing control measures.

Dual tasking

IN MANY WAREHOUSE environments, most of the travel completed by lift truck equipment or by walking is nonproductive. For example, a lift truck operator moving a unit load of product from a receiving point to a storage location typically returns to the receiving point empty. Thus, the operator is productive only 50 percent of the time.

The solution comes in the form of dual tasking, which enables the operator to use the return portion of the trip for more productive purposes such as shipping or internal product movements. Moving product to a shipping dock on the return trip greatly improves the efficiency of the operator, particularly if the distances traveled in the building are substantial.

Dual tasking can be accomplished in two ways—manually or with the assistance of computer software. The software uses information technology systems and on-board frequencies to determine what the next best optimal move will be, reducing labor costs by as much as 50 percent. Manual optimization may have lower percentage utilization, but it will still reduce labor and travel time.

Double-wide/double-high handling

INCREASING THE NUMBER of loads carried on a truck will reduce both the frequency of lift truck trips in the warehouse and the number of times the product is touched. The number of loads carried will depend on the lift truck weight and height capacities as well as the weight and height of the loads carried. Average lift truck capacities range from one to four unit loads per trip.

Depending on unit load characteristics, double-high loading can be mastered with a little practice. Several suppliers offer attachments that enable double-wide and double-wide/double-high configurations. In any load configuration, safety should remain the top priority. Ensure the lift truck operator maintains proper visibility during the transfer. Reliability of product integrity must also be maintained by ensuring the product load is stable during transport.

DATA Requirements

Basic data on the warehouse and its operations must be collected to implement the seven practices discussed in this article. The data serve to establish a baseline of current performance (and current costs) and help determine the benefits of proposed changes. Desirable data include:

1. General warehouse operations:

- Number of shipping and receiving (S/R) days and hours per year
- Number of orders processed per S/R day
- Number of pallets received or produced for each lot
- SKUs requiring contract packaging operations and planned SKU inventory levels
- Current staffing levels (by shift, assignment)
- Current storage configurations to include method (floor, rack, etc.), stackability factors (by SKU), and non-storage uses of space (offices, lockers, etc.)

2. Results of last physical inventory:

- Number of unique SKUs stored in the warehouse
- Quantity of each SKU

3. Order profile (this should represent at least a year's worth of data)

- Total number of orders processed
- Total number of order line items
- SKUs per order
- Units shipped (by line item)
- Units shipped (by total quantity)
- Total number of unique SKUs shipped
- Total volume by unique SKUs

Storage

SUBSTANTIAL CAPITAL investment in both building structure and inventory demands a rigorous approach to optimizing available storage space. Today, most companies compute warehouse utilization rates based on square footage. This measure is entirely misleading because it does not account for poor usage of building height. Companies typically use only eight to ten feet of height (based on two-high floor storage) even though they may have 28 feet or more of clear height available.

If you use conventional floor storage, establish and maintain a stackability factor for each SKU. If the stackability for a certain SKU is currently only two, test whether improving the

palletizing method or adding a slip-sheet—a 1/2-inch thick piece of cardboard or plywood—in between unit loads will enable you to stack higher. As always, it is important to maintain the highest levels of safety during testing and implementation.

Racking can also be used to increase cubic utilization. While it may seem expensive, add up the money spent annually on outside storage and compare that to the one-time investment. The return on invested capital is often strong enough to take to management.

Lot control

DEPENDING ON THE TYPE of product stored, lot control may play a critical role in the layout and operation of the distribution center. Typical warehouse management systems (WMS) must not only efficiently and accurately track the movement of products within the warehouse, but must also manage the status of each production or receiving lot. As product is received into the distribution center, a lot's status within the WMS may be "quality assurance hold," "quarantine," or "approved for shipment." Products falling under the guidelines imposed by the Food and Drug Administration have more scrupulous lot control programs to prevent poor quality product from reaching the hands of the consumer.

From a storage optimization standpoint, the layout of the distribution center must consider the average lot size by SKU (in pallets) so that the storage row lengths closely approximate either the average lot size or some optimal multiple of lot size. If lot sizes are typically in truckload quantities of 28 pallets, then an optimum layout of storage rows may be 14 or 28 pallets per row, depending on column spacing and stackability factors. Products with higher lot size quantities, more popular demand (class A SKUs), and taller stacking characteristics will allow for deeper storage row patterns. Deeper storage rows will improve storage utilization and density by reducing the amount of non-storage space associated with lift truck storage and transfer aisles. Lot sizes and the number of SKUs will also determine the method of storage. A larger number of SKUs with smaller production or receiving lot sizes may justify single or double-deep racking, while larger lot sizes with virtually no stacking capability may lean toward drive-in, drive-through, or flow rack applications.

Contract packaging requirements

TODAY'S GLOBALLY competitive market demands a flexible production and distribution network. Delivering a variety of SKUs that meet the customers' needs in a timely manner is one key to success in the distribution chain. Limitations in the production of this vast array of SKUs influence many companies to achieve SKU differentiation at the distribution center or contract packager (co-packer) rather than at the production facility. Co-packing functions may include mixing SKUs on a display pallet, shrink wrapping two items together as a single sale item, or fulfilling other requests necessary to meet customer and consumer needs.

> Substantial capital investment in both building structure and inventory demands a rigorous approach to optimizing available storage space.

Locating the co-packing functions at the distribution center substantially reduces touches, travel, and transportation expenses associated with this process. Typically, co-packing space is somewhat central to the product locations or dock doors. If this operation serves as a cross-dock operation, then its location must minimize travel between the receiving and shipping doors.

Putting it all together

WITH THESE SEVEN practices in mind, let's revisit the warehouse mentioned at the beginning of this article. The warehouse's last physical inventory showed a total of 2,500 unique SKUs in storage. The order profile—4,000 orders were examined over the course of a year—showed that only 1,300 of those SKUs shipped over the same time period. The 1,200 SKUs that did not move were classified as D category SKUs and were placed on a list to be reviewed with field sales for immediate sale (substitutions) or disposition. Those that were not saleable or to be discarded were moved into the least efficient part of the warehouse, as far away from the docks as possible. Again, the objective is to minimize the number of times each product is touched.

The order profile showed that a total of 260 SKUs delivered 75 percent of the warehouse's volume. These SKUs were classified as A category SKUs and were moved to the storage areas closest to receiving and shipping operations.

The order profile also showed that 60 percent of line items shipped were full pallet quantities, while the remaining 40 percent were cases. Since the average time to build an order was from 1 to 1 1/2 hours, this would provide an excellent application for forward picking. A forward picking zone central to the shipping operation was created and a manual (Excel-based) master pick process was implemented until software could be justified.

The warehouse stored two pallets high and 12 to 24 pallets deep, with considerable space lost to partially filled rows. Considering inventory turns and lot sizes, rows would need to be shortened and space compressed. A 1/2-inch slip-sheet would permit safe

Choosing WAREHOUSE SPACE

Some time back, an operations director of a billion dollar company bragged he had the cheapest warehouse space in the country. And no wonder: the building was shaped like a triangle, major structural members hung just out of reach, and there was so much dirt and dust on the floor you couldn't tell what the floor was made of.

The fact is you get what you pay for. While this manager was focused on a single budget item, the extra expense from lower productivity, lower utilization, higher product damage, and a higher incident rate was probably costing him more than what he would have paid for better space.

So what should he, and you, look for in warehouse space?

Building shape

Irregular building shapes (e.g., triangles) contribute to inefficiency by forcing storage rows and aisles to conform to the building shape. This affects the number and type of storage rows and configurations and the movement of materials within the warehouse. A rectangular building shape permits consistency of row depth and right angle travel paths. Beware of a pencil-shaped building, though, as it can add up to significant travel times from dock to storage and back. Ideal length-to-width ratio is between 1:1 and 2:1.

Clear height

The more unobstructed space (three dimensions) you have, the higher the asset utilization can be. Clear height is usually measured from the floor to the point of the lowest obstruction. Typical obstructions include structural members (e.g., joists), lighting elements, fire protection elements, ductwork, and piping. Be sure to check on local codes, as many locations require storage items to be kept a certain distance (usually 1.5 to 2 feet) from fire sprinklers. Look for a minimum of 33 feet clear height in any warehouse you consider.

Floor capability

Often overlooked, floor capability should be an important consideration in every warehousing decision. Floor capability is important in four ways.

- Static loading, for materials stored on the floor or in racks: If you plan to store in racks, even though it may be in the future, make sure the floor is capable of taking the loads from racking, as they are much higher than conventional floor storage.
- Dynamic loading, for materials placed on the floor via fork truck movement: Make sure the floor is sufficient to withstand the point loads that arise from product movement. Warehouse floors typically require a 4,000 psi rating.
- Levelness: Floors should be as level as possible, especially if you are considering racked storage. Look for a difference of no more than $^1/_{16}$" per linear 10 feet.
- Sealed floors: Floors that have been sealed improve cleanliness and damage by reducing moisture and dust build-up.

Column spacing

Columns are the structural members within the walls of the warehouse that hold up the roof. They should be spaced consistently and evenly throughout the building. Inconsistent column spacing leads to inconsistent storage rows and aisles and can reduce efficiency and increase safety risks. Ideal column spacing is 60 feet in the direction perpendicular to the dock area and 40 feet in all other directions.

Non-storage space

Non-storage space is perhaps the most overlooked area in selecting warehouse space. Areas such as offices, lockers and restrooms, staging and dock areas, travel aisles, and fire breaks contribute to non-storage space. These areas can easily add up to 40 percent or more of the total available space. For example, 100,000 square feet of warehouse may actually only equate to about 60,000 square feet of storage space.

Whether building new or going into existing space, make sure you understand both storage and non-storage requirements and consider both in determining your warehousing needs.

Choosing wisely

Don't be caught with cheap space that doesn't get the job done. Focus first on the fundamentals—building shape, clear height, floor capability, column spacing, and non-storage areas. Then worry about negotiating a good price. This way you will ensure the proper balance between budget and smooth, efficient operations.

storage of more than 90 percent of the SKUs at these heights. The slip-sheet would also stabilize the unit loads so they could be transported two high, greatly improving the warehouse's put-away efficiency.

Warehouse operations were drastically improved. Not only was there an increase in productivity, but labor expenses were reduced by more than 25 percent by addressing these key practices. In addition, the company was able to reduce the amount of storage space—including all outside storage—and associated expenses by 50 percent, clearly validating that cleaning up chaotic operations can have a positive impact on your bottom line.

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