

## *Adding storage space without leasing or buying*

**Les Wood, Les Wood Associates, North Andover, MA**

*Star Trek* and *Star Wars* aren't the only places to find space wars. They're being fought every day in industrial plants.

Sooner or later, every growing company runs out of space – if only temporarily. It does not usually happen overnight, but it creeps up, revealing itself in a series of conflicts between groups competing for the same space.

Before leasing or building more space, it's a good idea to take a close look at how current space is being used. There are many actions that can be taken to increase storage capacity or reduce storage needs, ranging from simple procedural changes to substantial capital investments.

Here are some ideas on how to gain space, starting with the simpler, lower cost ones and working up to larger ideas that will need detailed planning and financial analysis before deciding on them.

### **Clear out the graveyard**

Every plant has its "graveyard" of used equipment – stuff that "we will use again someday." What began as a temporary resting place has become a graveyard for rust-accumulating dinosaurs. Often, the only reason the equipment was not discarded ages ago is because it is still being carried on the books. Whether a piece of equipment remains on the books should not be the determining factor for retaining it. By tying up space, keeping it may actually be costing money. It is time for hard decisions.

### **Remove obsolete product**

Are all of the products stored in the warehouse still active? Review the SKU list for obsolete products to eliminate.

### **Minimize staging**

Are lift truck drivers picking products from the warehouse and staging them in front of the shipping doors, to be moved into a trailer later? This practice is common, but staging occupies floor space. The ideal situation is to pick product and place it directly in a waiting trailer, which minimizes space needs and eliminates double handling.

### **Ship on all shifts**

Is manufacturing working two or three shifts while the warehouse is shipping on only one shift? If so, production builds up before it is cleared out the following day, making space for the next production buildup. If trailers can be loaded on those "off -shifts" the buildup of inventory and the additional space it needs can be avoided.

### **Stack Higher**

Maybe your product is packed in corrugated cases that are stacked on pallets and stored two, three, or four pallets high on the floor. This can be the densest, most cost-effective form of storage, but there may be ways to improve.

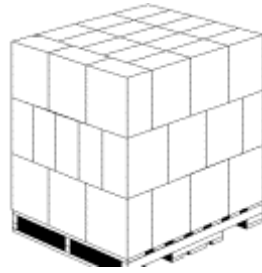
If stacking can be increased from two pallets high to three pallets high, storage capacity is effectively increased by as much as 50%. Often the factor limiting the height of the stacks is the strength of the corrugated – add more cases, and the bottom layers start to crush. But, there are ways to make the stack stronger.

### **Column Stacking**

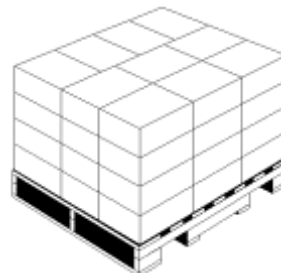
The two typical ways of arranging stacks are *interlocking* (Fig. 1) and *column* (Fig 2).

Interlocked stacks provide stable loads for transporting; however, the corners of the cases are not aligned. Since 80% of a corrugated case's stacking strength is in its corners, the weight of the upper cases is transferred down through the corners onto the weaker sections of the bottom layer, which collapses.

By aligning the corners of cases in columns, the weight of the load is transferred to the floor or pallet through the strongest part of the case. The resulting increase in strength can be dramatic – often more than double. The downside may be that switching from an interlocking style to a column style makes the load less stable. Stretch wrapping the loads will usually make them secure.



**Fig 1. Interlocking Stack**



**Fig 2. Column Stack**

For maximum stacking strength, it is important not only to use column stacking but also to take care to align the corners of each case with the one below it. Even one inch of misalignment can result in as much as a 40% loss of strength. Avoid pallet patterns that overhang the sides of the pallet. Those unsupported corners are weak and more liable to cause a collapse.

### **Sturdier packaging materials**

One solution to the stacking problem is to use sturdier corrugated cases. Heavier board will increase the strength of the stack, allowing taller stacks. However, the heavier board can be costly. Examine the added cost carefully – it could make this alternative uneconomical.

### **Utilize the whole pallet**

Are pallet patterns using the full area of the pallet? Pallet utilization can be calculated by: Area of case times Number of cases per layer divided by Area of pallet. For those SKU's that have low utilization, consider these two questions:

- v Can the pattern be changed to fit more cases on the pallet?
- v Can the case be redesigned to better fit the pallet? (Be sure the redesign does not increase the cost of the case, making the change uneconomical.)

### **Check row widths**

How wide are the rows in which products are stored? If a standard fork truck is used for putting product away, rows may need to be as much as 8 or 10 in. wider than the product. But, side-shifters fitted to trucks allow drivers to move the load several inches from side to side, enabling them to maneuver pallets into rows only 4 or 5 in. wider than the loads. This may allow narrower rows, making room for additional ones.

### **Analyze the layout**

Is the warehouse laid out to suit the inventory? If the layout provides lots of deep storage rows and the inventory is mostly small quantities of many SKU's, there will be lots of empty space in the rows. (Unless of course, in desperation, rows have been filled by putting two or more SKU's in a single row. In that case, there will be problems reaching some products, others will be lost, and time to retrieve products will soar.)

In other cases, there may be a lot of single-face, selective racks with as much as 50% of the floor space taken up by aisles. A different type of storage might still allow access to each SKU, but with fewer aisles.

To correct such situations, analyze the inventory to determine the ideal mix of deep and shallow rows and racks, then lay out the warehouse to provide that mix as closely as possible. This type of analysis and layout may need a consultant with special expertise to develop and implement, but the resulting benefits may easily justify the expense.

## Use the right lift trucks

Lift trucks come in many sizes and types, each having different space requirements. The first question to ask is "Are your trucks the right size for your operation?" Larger lift trucks require wider aisles for turning. If the heaviest load is 1500 lb, and 5000-lb trucks are being used, smaller, less expensive, 3000-lb vehicles could reduce costs and save space at the same time. Trucks designed specifically for use in narrow aisles usually have limitations that make them impractical for general use, so investigate thoroughly to ensure the design will suit the needs.

## Manage the inventory

Chances are, finished goods and raw material inventories are occupying most of the space in the warehouse. Managing these inventories can have the greatest effect on the space needed. Reducing them can open a lot of space. Here are some suggestions:

### Monitor inventory levels

The first step in controlling inventories is to track them on a regular basis. A simple, monthly report, with a graph showing the inventory turns for the month and year-to-date, is a good way to track progress in bringing them under control. Whenever the number of turns changes, up or down, investigate why and learn how to control it.

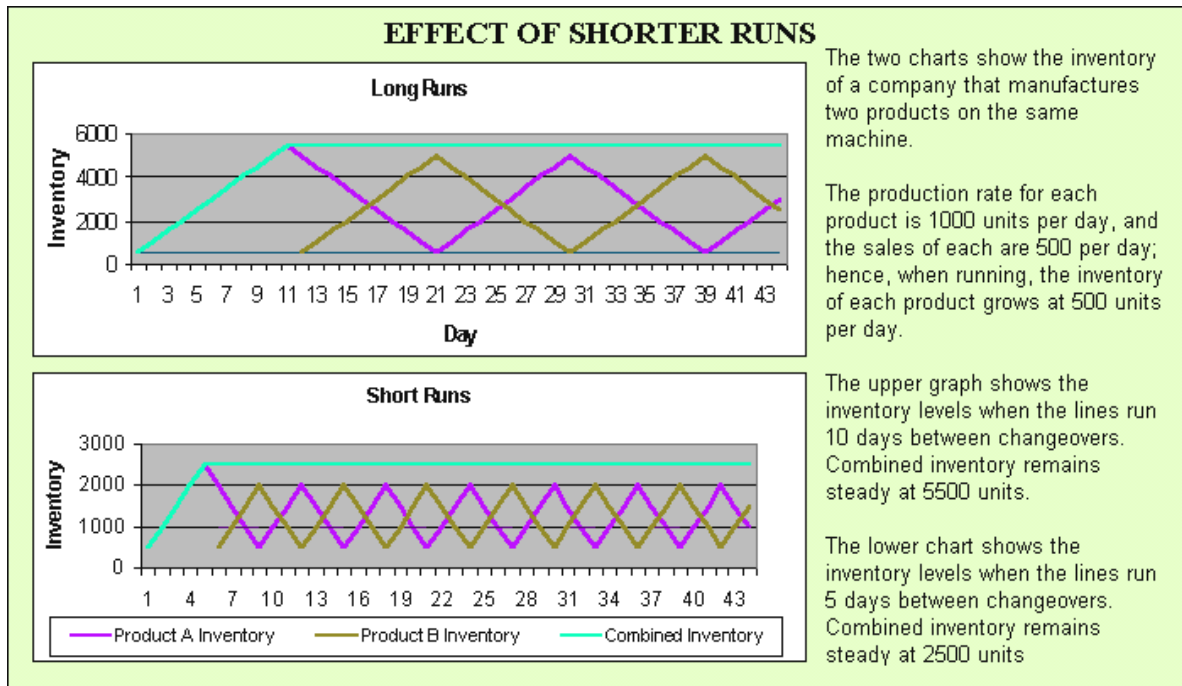
### Try for just-in-time (JIT) deliveries

Ordering raw materials to be delivered more frequently, in smaller quantities, closer to the time they are needed will reduce the inventory in the warehouse. The ability to do this will depend very much on supplier relations and control of the production schedule.

### Consider shorter runs

Manufacturing staffs like long runs. Long runs reduce the number of changeovers and allow greater production. However, they create larger inventories. The charts in the accompanying sidebar show how shorter runs reduce inventories.

Ideal run length is a balance of the cost of changeovers versus the cost of carrying inventory (cost of money tied up in inventory, risk of obsolescence, etc.). More efficient methods of changing over will reduce their cost and allow shorter runs.



## Reduce the number of products

Every item discontinued will reduce inventories and save space. This is not an easy decision to make, and inventory reduction is far from the most important factor in that decision. It may be, however, that a few probing questions reveal some surprising answers.

## Use the right racks

Racks can dramatically increase storage capacity. However, they are expensive, and they may not gain as much space as expected. Before investing in them, analyze the potential gain in storage space and the financial benefits.

There are many types of racks, designed to satisfy different storage needs. The accompanying table describes some of the more familiar types.

<b>Common Types of Storage Rack</b>		
<b>Type of rack</b>	<b>Application</b>	<b>Limitations</b>
Selective - One deep	Most commonly used racking. Allows access to every pallet. Best used for small quantities of each SKU.	An aisle is needed alongside each rack. It is common for 50% of floor space to be taken up by aisle
Drive-in	Used for storing many pallets of the same SKU.	Gives denser storage than selective racks but less access. Retrieval is LIFO. (Last pallet in is the first pallet out).
Drive-through	Similar to Drive-in but pallets can be retrieved on a first in, first out (FIFO) basis.	Because there is an aisle on each side, it does not store as densely as Drive-in rack.
Flow-through	Rack has a series of conveyors running through it. Pallets are loaded on one side and roll down the conveyor to the other. This allows FIFO retrieval and is often used for feeding picking operations.	Relatively expensive. Pallets tend to stick part way down the conveyor. Mechanical solutions have been developed to prevent this, but they are even more expensive. Provides more faces than drive-through
Push-up, roll-back	Similar to Flow-through, but product is retrieved on LIFO basis. Useful for using dead space over offices, etc.	Expensive to install. Drivers need a great deal of skill to place and retrieve pallets.

-- Edited by Richard L. Dunn, Chief Editor, 630-320-7141, rdunn@cahners.com