The FIFO Myth

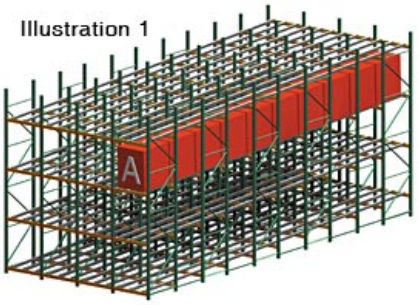
First-in, first-out inventory control is possible with any storage method.

By Kevin Minkhorst

For the last 50 years, the material handling industry has taken for granted the basic concept that pallet flow rack is first-in, first-out (FIFO) and drive-in and pushback racks are last-in, first-out (LIFO). While this may be true in theory, practical use of these storage methods shows otherwise. Pallet flow racks should not be touted as the only way to achieve FIFO. The diagrams and explanations on these pages illustrate that FIFO can be achieved with any storage method—from floor storage to pushback.

First is the issue of what is to be stored. No two situations are identical, and rules of thumb are just that—good approximations to use for most, but not all, situations. When asking an end-user for inventory information, the key bits of data to look for include the number of products (SKUs), the number of pallets per product and the typical incoming and outgoing quantities (i.e., one pallet at a time, a truckload at a time or something in between).

The most successful flow rack applications involve high volumes of similar product, typically for a manufacturer of consumer products with a limited number of SKUs (say, less than 100). The key reason that high volumes and low SKU counts are necessary is to avoid honeycombing. To illustrate the honeycombing issue, consider the example of a 10-deep flow rack system and see how varying inventory amounts change the occupancy of the racking. Occupancy is the actual number of pallets being stored divided by the theoretical maximum pallets stored as a percentage. For example, 75 pallets stored in a system that has a capacity of 100 would be 75 percent occupancy.



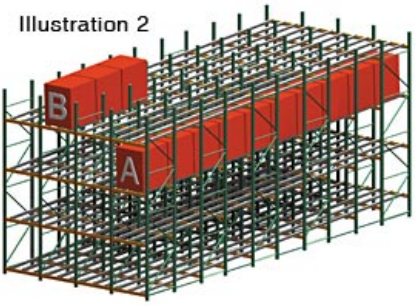


Illustration 1 shows a 10-deep flow rack system with one full lane of 10 pallets of "red" product. Now, if there were only the 10 pallets in the one lane of 10-deep flow rack, occupancy would be 100 percent. However, inventory by its very nature fluctuates. With an average of 10 pallets, that means sometimes there are less and sometimes there are more. It's when there are more that trouble occurs.

Illustration 2 shows what happens when the inventory climbs to 13 pallets. Inventory takes up an additional lane, and now occupancy has dropped to 13/20, or 65 percent. Statistically speaking, over time as pallet count goes up and down and the average is 10 pallets per product, the flow rack will look like the example in Illustration 3, where there is one partial lane of incoming product and one partial lane of outgoing product. Occupancy is now 50 percent; that is, 10 pallets are being stored in 20 locations.

Increasing Storage Density

Operating any storage system at 50 percent occupancy is very expensive. In order to increase the storage density, it will be necessary to add more pallets of the same product. Illustration 4 shows 66 percent occupancy (20 pallets in 30 locations) and Illustration 5 shows 75 percent occupancy (30 pallets in 40 locations).

Any storage solution should target 75 percent occupancy as the minimum acceptable utilization. That being the case, it is clear that a 10-deep flow rack would need 30 pallets per product as a minimum to achieve this, or three times the storage depth. This is known as the "Rule of 3," and this general rule is a quick way to determine the feasibility of any storage system. As an example, if

your customer is considering a 15-deep flow rack, then check inventory levels to see if they have a minimum of 45 pallets per product. If those levels are 45 or more, then occupancy levels would be 75 percent or higher.

Illustration 3

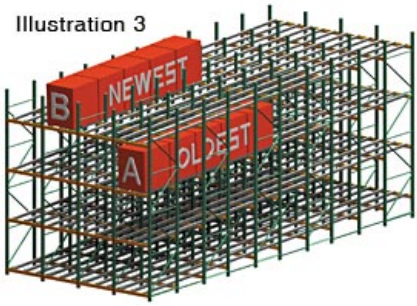
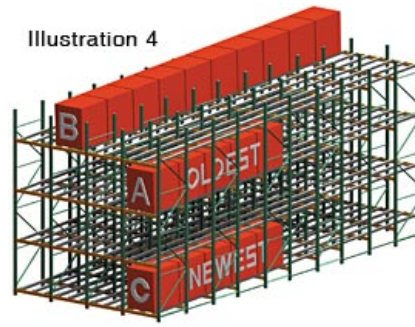


Illustration 4



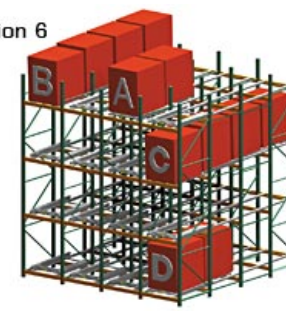
There is one other very important factor at work here. Notice that in Illustration 5, there is one partial lane of outgoing product, one partial lane of incoming product and two full lanes of the same product. The significance of this is that the end-user must take care when retrieving or putting away pallets. If a forklift operator pulls stock from the wrong lane, FIFO is lost! When picking from the "C" lane instead of the "A" lane when loading a truck (because it was easier to get to), stock rotation is lost. Properly configured flow rack does not guarantee first-in, first-out. There still must be some type of inventory management system to keep track of which location to pick from.

The Pushback Comparison

Now see how pushback compares. Take the example of a four-deep lane and institute two key rules. First, apply the "Rule of 3," and, second, never replenish a partially filled lane with a new lot code of the same product or with a different product. The "Rule of 3" dictates that only products that average 12 or more pallets (3 x 4 deep) should be put into the system. Illustration 6 shows 12 pallets stored in four lanes—one partial lane of outgoing product, one partial lane of incoming product and two full lanes of the same product. When it comes time to pick pallets for shipping, just pick the oldest lanes first—A, then B, C and D (just like with the flow rack). When new product comes in, even though there are partial lanes with space, put E in a new lane. As long as the "Rule of 3" is followed, there will always be 75 percent occupancy or higher. The fact that a majority of pushback systems are sold to manufacturers and distributors of food products is testament to the case that FIFO is possible with pushback.

Illustration 5

Illustration 6



FIFO can even be achieved with drive-in racking, provided that the "Rule of 3" is followed. That's why successful drive-in rack systems typically house hundreds of pallets of the same product. As an example, a four-deep by four-high drive-in system has 16 pallets per tunnel. Three times 16 gives a minimum of 48 pallets per product required to achieve an occupancy of 75 percent and rotate the stock. Any smaller quantity will make stock rotation difficult and result in poor occupancy.

With ever-increasing pressure to decrease inventories, few customers have such high volumes of product. Hence, pushback, which allows users to efficiently store smaller lots, is growing in popularity.

Consult the chart below to determine what will work best for your customer's application. The figures are based on a four-pallet-high scenario. The chart shows that no one storage type is suitable for all categories of inventory. Therefore, we generally like to see at least two—if not three or more—storage methods used in any given warehouse. Using these rules of thumb and following some simple stock rotation practices ensures the best combination of FIFO, selectivity, storage density and lowest overall cost.

The key data to ask a material handling end-user for include the number of products, the number

of pallets per product and the typical incoming and outgoing quantities.

AVERAGE PALLETS PER PRODUCT	SELECTIVE RACK	DRIVE-IN RACK	PUSHBACK RACK	PALLET FLOW RACK
1 TO 5	SINGLE DEEP	N/A	N/A	N/A
6 TO 8	DOUBLE DEEP	N/A	2 DEEP	N/A
9 TO 11	N/A	N/A	2/3 DEEP	N/A
12 TO 15	N/A	N/A	3 DEEP	N/A
15 TO 23	N/A	N/A	3/4 DEEP	N/A
24 TO 35	N/A	2 DEEP	4/5 DEEP	8 DEEP
36 TO 47	N/A	3 DEEP	5/6 DEEP	12 DEEP
48 TO 59	N/A	4 DEEP	6 DEEP	16 DEEP
60 TO 71	N/A	5 DEEP	6 DEEP	20 DEEP
72 TO 83	N/A	6 DEEP	6 DEEP	24 DEEP