
FIRST-IN,
FIRST-OUT

# FIRST-IN, FIRST OUT
## THE FIFO MYTH

***Originally submitted for print to "The MHEDA Journal", Fall 2007***

For the last 50 years our industry has taken for granted the basic concept that pallet flowrack 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 us otherwise. As a manufacturer of both pallet flow and pushback rack systems, and as an organization that spends a lot of its time with dealers and end-users configuring rack layouts to maximize space and efficiency, we take issue with pallet flow racks being touted as the only way to achieve FIFO. With the following diagrams and explanations, we'll try to explain our concepts and show that you can achieve FIFO with any storage method – from floor storage to pushback.

We'll first have to tackle the issue of what is to be stored, and make some generalizations. We realize that no two situations are identical and that rules of thumb are just that – good approximations to use for most, but not all, situations. When we ask an end-user for inventory information, the key bits of data we are looking for include the number of products (SKU), the number of pallets per product and the typical incoming and outgoing quantities (ie 1 pallet at a time, a truckload at a time, or something in between). In our experience, the most successful flowrack applications involve high volumes of similar product, typically a manufacturer of consumer products with a limited number of SKU, say, less than 100. The key reason that high volumes and low SKU counts are necessary: to avoid honeycombing.

To illustrate the honeycombing issue, lets use an example of a 10 deep flowrack system and see how varying inventory amounts change the occupancy of the racking (occupancy being defined as the actual number of pallets being stored divided by the theoretical maximum pallets stored as a percentage – for example, 75 pallets being stored in a system that has a capacity of 100 would be 75% occupancy).

**Illustration A** shows a 10 deep flowrack system with one full lane of 10 pallets of "RED" product. Now, if all we had were the 10 pallets in the one lane of 10 deep flow our occupancy would be 100%. However, inventory by its very nature fluctuates. If we average 10 pallets, that means that sometimes we have less and sometimes we have more. It's when we have more that we

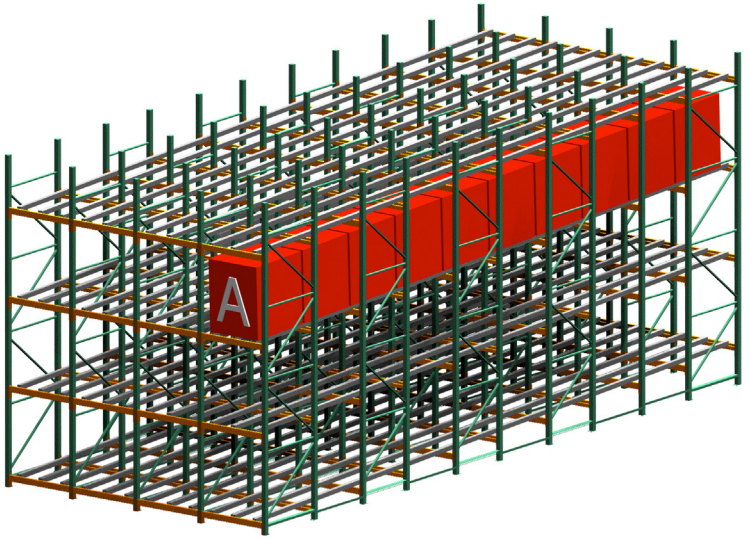


ILLUSTRATION A

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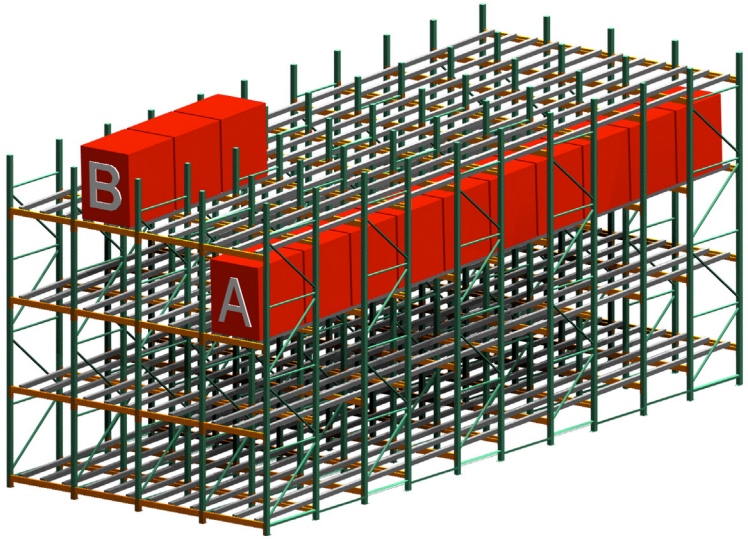


**ILLUSTRATION B**

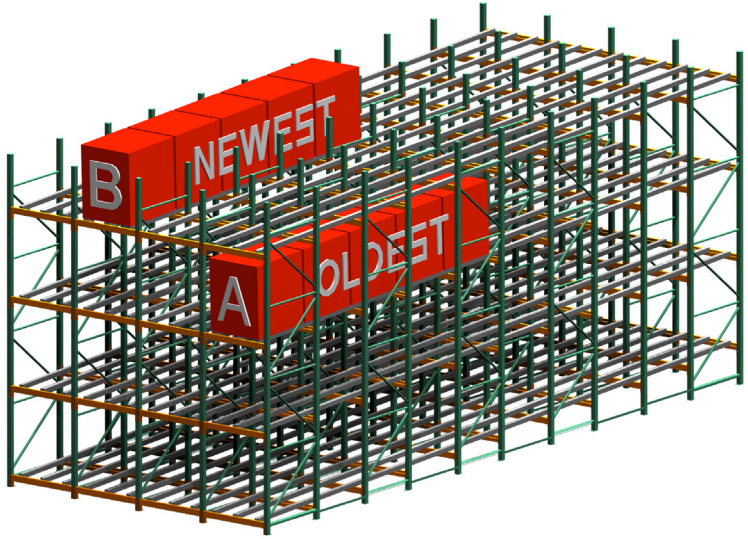


**ILLUSTRATION C**

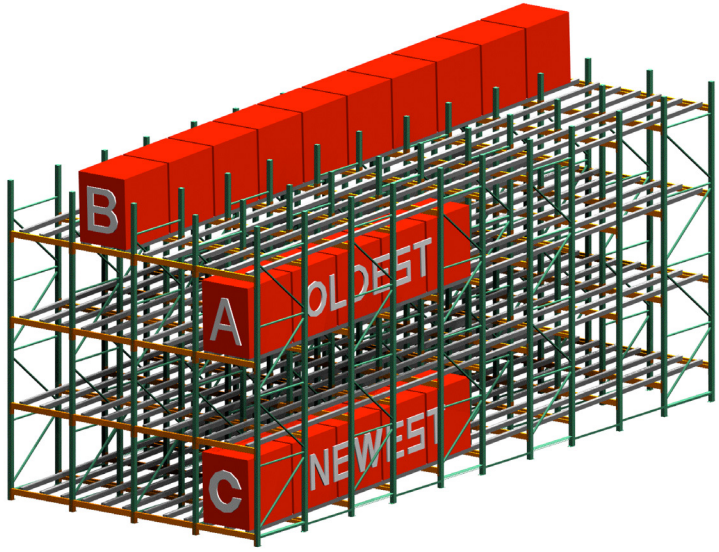


**ILLUSTRATION D**

run into trouble. **Illustration B** shows what happens when the inventory climbs up to 13 pallets – we end up using an additional lane and now our occupancy has dropped to 13/20 = 65%. Statistically speaking, over time as our pallet count goes up and down and we average 10 pallets per product the flowrack will look like the example in **Illustration C**, where we have one part lane of incoming product and one part lane of outgoing product. Our occupancy is now 50%, that is, we are storing 10 pallets in 20 locations.

Operating any storage system at 50% occupancy is very expensive. In order to increase our storage density we'll have to add more pallets of the same product. **Illustration D** shows 66% occupancy (20 pallets in 30 locations) and **E** shows 75%

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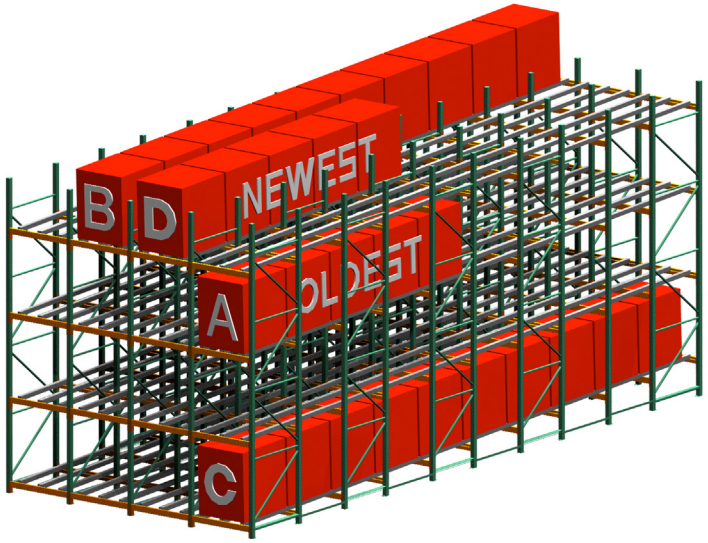


**ILLUSTRATION E**

occupancy (30 pallets in 40 locations). It is our belief that any storage solution should target 75% as minimum acceptable utilization. That being the case, you can see that for a 10 deep flowrack, you would need 30 pallets per product as a minimum to achieve this, or **3 times** the storage depth. For the last 15 years or so we have being calling that the "Rule of 3", and this general rule of thumb is a quick way to determine the feasibility of any storage system. As an example, if our customer was considering a 15 deep flowrack, then we'd check inventory levels to see if they had a minimum of 3 X 15 or 45 pallets per product. If those levels were 45 or more then we'd know that occupancy levels would be 75% or higher.

There is one other very important factor at work here. Notice that in **Illustration E** we have one part lane of outgoing product, one part lane of incoming product and 2 full lanes of the same product; the significance of this is that we must take care when retrieving or putting away pallets – **if we pull stock from the wrong lane we lose FIFO!** If a forklift operator picks 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 Flowrack does not guarantee First-in First-out, we must still have some inventory management system that keeps track of which location to pick from.

Now let's look at pushback and see how it compares. For our example we'll use a 4 deep lane, and by instituting two key rules – a) apply the "Rule of 3", and b) never replenish a partially filled lane with a new lot code of the same product or with a different product. Using the "Rule of 3" dictates that we will only put products that average 12 or more pallets (3 X 4 deep) in the system. **Illustration F** shows 12 pallets stored in 4 lanes - one part lane of outgoing product, one part lane of incoming product and 2 full lanes of the same product. When it comes time to pick pallets for shipping, we just pick

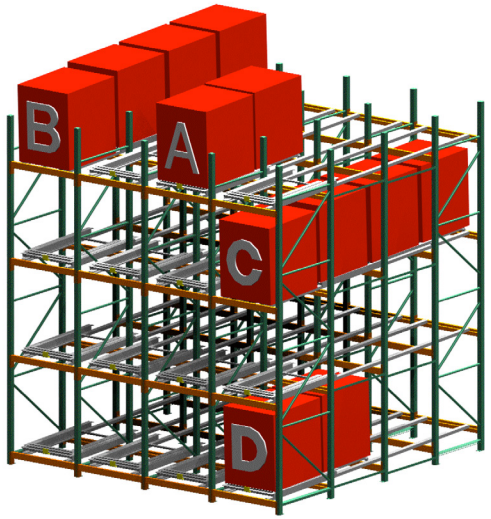


**ILLUSTRATION F**

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the oldest lanes first – A, then B, C and D (just like we have to do with the Flowrack). When new product comes in, even though we have part lanes that have room, we will put E in a new lane. As long as we follow the "Rule of 3" we'll always have 75% occupancy or higher.

The fact that over half of our pushback systems are sold to manufacturers and distributors of food products is testament to the case that FIFO is possible with pushback. You can even achieve FIFO with drive-in racking providing you follow the "Rule of 3". That's why successful drive-in rack systems typically house 100's of pallets of the same product. As an example, if we have a 4 deep by 4 high drive-in system, that gives us 16 pallets per tunnel. 3 times 16 gives us a minimum of 48 pallets per product that would be required to achieve an occupancy of 75% and rotate the stock. Any quantity less than that will make stock rotation difficult and result in poor occupancy. With ever increasing pressure to decrease inventories, there are few customers left who have such high volumes of product, and hence we see the growing popularity of pushback which allows us to efficiently store smaller lots.

In summary, we've included a chart that gives the rule of thumb for all of the storage types, based on a 4 pallet high scenario.

You can see from this chart that no one storage type is suitable for all categories of inventory, and therefore we generally like to see at least 2 if not 3 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.

| 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 14 | N/A | N/A | 3 DEEP | N/A |
| 12 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 |