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# Slow Moving Inventory - A Primary Bottleneck In DC's With High SKU Count

The Pareto Principle, also known as the 80-20 rule, states that for many situations 80% of the effect comes from 20% of the cause. To some extent, this same principle holds true for most Distribution Centers (DC's) wherein a large subset of slow moving inventory makes up a relatively small percent of total order volume. What's more, slow moving inventory subsets often cause:

**Inefficient Storage Utilization:**
Product that has been reduced to a handful of cases often occupies a "larger than necessary" storage space.

**Difficult and/or Congestive Picking:**
To maximize space, pick slots for slow moving inventory is often placed in high reach locations requiring special equipment. These areas often create congestion and become an overall bottleneck in order fulfillment.

**Unproductive Replenishment:**
Many warehouses utilize carton flow rack to increase pick slots for slow moving inventory items. Overhead pallet storage serves as a reserve for these items. The periodic replenishment of carton flow lanes can be labor intensive, i.e. retrieve a pallet via forklift, move 6 to 8 cases to a flow lane, and return the pallet to reserve storage.

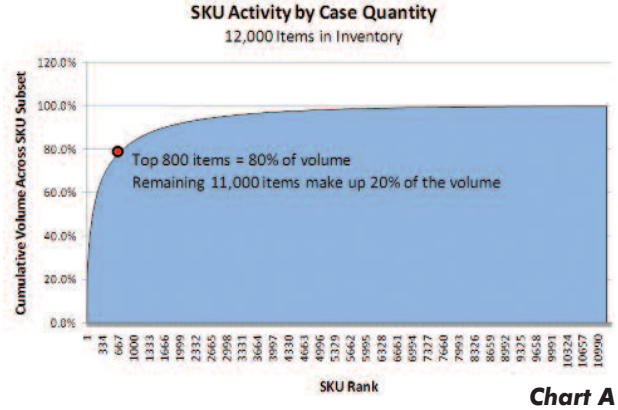



***Chart A***

## Solution: Dynamic Pick Slots For Slow Moving Product

An operational analysis of historical data will help to identify which inventory items should be classified as "slow movers". The Pareto Curve Chart illustrated in Chart A reveals several thousand inventory items with very little order volume. Note that over 10,000 of these items represent only 10% of the total volume. These items can be classified as "Slow Movers", or Class C Subset. While the total SKU count and representative volume will vary by operation, it is almost certain that a slow moving subset will be represented by a large majority of items. It is also likely that, within this subset, only a small portion of items will be needed to satisfy orders from day to day. Chart B, for example, shows that on any given day only 15 to 20% of the slow moving items have orders.

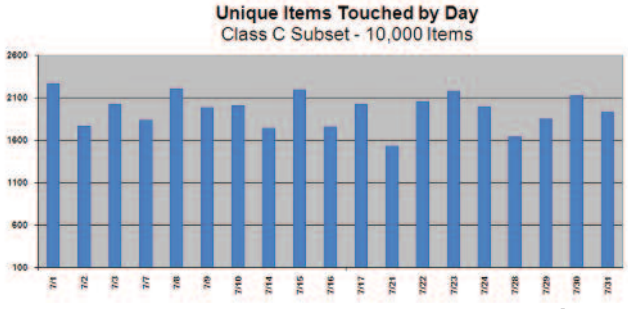
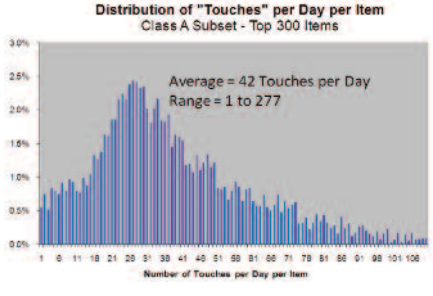


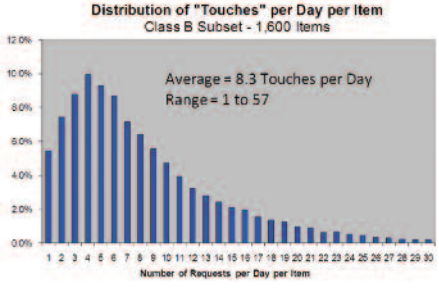

***Chart B***

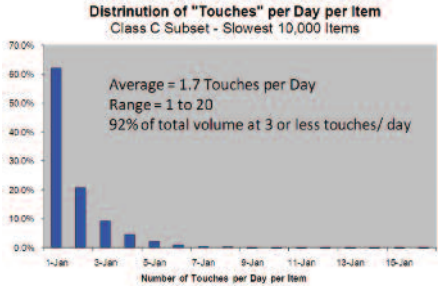
What's more, slow moving inventory items are rarely needed multiple times throughout the day. The following charts illustrate the significant difference between fast, medium, and slow moving inventory subsets (Class A, B, and C Subsets). Class A items are touched repeatedly throughout the day (i.e. dozens of orders need that item; one touch represents one order requiring that item). By contrast, Class C items (when needed) are touched once or twice throughout the entire day.

Slow moving inventory items are commonly defined by these critical characteristics as illustrated below:

1. Only a small portion of these items are needed to fill orders from day to day, and the specific items required will change from day to day.
2. Items that are required on any given day, are generally touched only a couple of times to fill the handful of orders needed.



These characteristics are very typical across most order fulfillment operations and present a good opportunity for dynamic pick slots. Rather than dedicating inventory to a specific pick slot, slow moving inventory is assigned to a bank of "Dynamic" pick slots. As orders are received into the Warehouse Management System (WMS), inventory will be moved from a reserve location to an available pick slot. The dynamic bank of pick slots may be sized according to one of the following configurations:

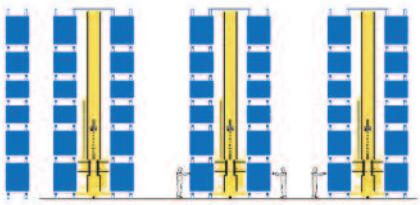
**a.** Sized to accommodate the maximum number of items needed for any given day based on historical analysis of order activity for items classified as slow movers. Some level of order look ahead is generally available to begin staging inventory ahead of the picking shift. Depending on the order cutoff time, the goal is to stage all items needed for the day before the pick shift begins.

**b.** Sized to create a 2 – 4 hour buffer of work ahead of the pick operator(s). Because the majority of slow moving items are needed only once or twice throughout the entire day, there is no operational need to keep it in a pick slot after it has been serviced. Pick slots can therefore be re-cycled throughput the pick shift, ahead of the operator(s).

Dynamic pick slots can apply to various material handling mediums such as Pallet Based Inventory, Trays and Bins, or Individual Case Handling. Each of these solutions provide different features and benefits as described below.

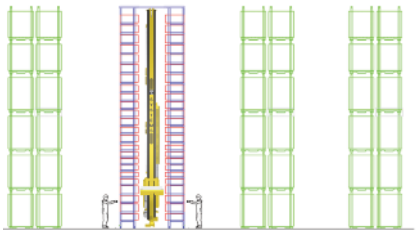
**Pallet Based Inventory:**

When slow moving inventory is received in full pallet or partial pallet quantity, it can be received directly into an automated pallet handling system with dynamic slotting. In this type of configuration the aisles are spaced to allow pick operators to access loads from the side of the system at floor level. When the inventory is no longer needed in a pick slot, the SRM retrieves the load and selects the best available putaway location. Note that as the inventory is depleted, the load becomes shorter over time and can migrate to shorter putaway locations. It is therefore possible to attain 6 or 7 tiers of storage in a traditional warehouse.



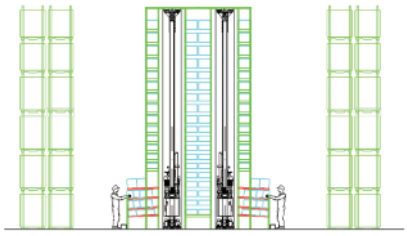
**Trays and Bins:**

When dealing with relatively small amounts of inventory (i.e. low on hand cube per item) it is often more cost effective and efficient to store those items in bins and trays. This type of configuration provides much greater density in terms of storage and pick slots. A typical 35' tall system can accommodate 4 tiers of pick slots at the floor level and 20 tiers of reserve storage overhead. In a 300' long, 35' clear warehouse, a one aisle system provides over 1000 pick slots along a side port and 5400 reserve storage locations. A single aisle can be inserted in the midst of a classic pick to pallet operation. In such a scenario, the operator would serpentine through the warehouse stopping at full pallet pick locations for fast moving inventory and dynamically allocated tray locations for slow moving inventory.



**Individual Case Handling:**

In many instances, slow moving inventory is received in partial pallet quantities. Rather than storing a partial load in a pallet rack, these inventory items can be inducted directly into a case handling AS/RS. A typical case AS/RS configuration will support thousands of case storage locations and hundreds of carton flow pick slots along a side port. Because of the high pick slot density, items may be dedicated to a carton flow lane. If dynamically configured, the pick lanes are primed with the number of cases needed to fill the demand for the day, shift, or wave. If a single lane does not have enough physical space, multiple lanes may be dedicated to an item to accommodate the quantity required.



In conclusion, slow moving inventory tends to be a primary bottleneck in DC's with high SKU count. The following procedure can be used to better manage this bottleneck:

1. Analyze historical data to determine which subset of inventory should be classified as "slow movers". Key indicators to consider in the analysis include aggregate volume over a time period, aggregate touches over a time period, distribution of touches per day.
2. Evaluate how this inventory is received into the warehouse: i.e. full pallets, partial pallets, floor loaded loose case, etc. This determines the eventual prep work required to bring it into the proposed new system.
3. Evaluate the handling requirements of the picked UOM. When dealing with small pack items, for example, a tray based system may be preferable to a case handling system.
4. Determine the storage and throughput requirements for the entire subset being classified as slow movers. Check historical order volume, filtered against this subset, to determine peaks.