

Lean Warehouse SKU Slotting

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Abstract

In most of our Lean Warehouse projects one of the final steps before the move is to “slot” certain SKUs into bin locations within the warehouse. If you will be using fixed locations for some or all of your SKUs in your future warehouse, you can use the methodology in this paper to more effectively define those locations. Over the course of these kinds of projects, we assemble the data we need for slotting including the space needs, velocity, and storage type decisions for each SKU. This white-paper will discuss what is most important when slotting SKUs and how we recommend approaching the process depending on your specific needs.

What you need to successfully slot SKUs

We recommend slotting SKUs as the final analysis step before the warehouse move. We also have other white papers on lean warehouse which cover how to develop a lean layout and then some recommendations for how to label positions in a lean warehouse.

- how to layout a lean warehouse <https://www.supplyvelocity.com/creating-a-lean-warehouse/>
- bin location codes: <https://www.supplyvelocity.com/lean-warehouse-aisle-bay-level-position-bin-location-coding/>

Clients who are used to a more traditional warehouse layout are tempted to specify where sets (brands, product categories, etcetera) of products will be slotted at the same time as they are designing the layout. However, this causes two problems. First, a layout designed that way, instead of maximizing labor productivity, generally will continue to fit items the way they are currently slotted in the warehouse. This defeats some of the purpose of the Lean Layout – to create a new layout that is not constrained by traditional thinking. In addition, as Lean practitioners we want to “mistake proof” (the Japanese term is “Poka-yoke”) picking by avoiding similar products stored next to each other.

One other distinctive feature of our slotting approach is that we choose to slot last. By slotting after the layout has been defined we are able to plan a “center of gravity” in our design and ensure the highest velocity items are slotted there. Using our process also takes advantage of the power of Warehouse Management Systems to direct order pickers to the location for an item since the path is determined by the bin location codes, which are already known at this point in our process.

To slot SKUs following our process you should ensure you have the following information identified:

- A finalized layout including storage media (e.g., floorstock vs. racks vs. shelves).
- Specifications for all storage including method and parameters such as height of levels on each rack / shelf.
- SKU data including:
 - The products
 - A size classification for each SKU
 - Extra small (XS), Small (S), Medium (M), Large (L), Extra large (XL)
 - The preferred storage media for that product

- An estimate of required space needed when stored via that storage media.
 - We generally use linear feet on small item shelving, pallet positions on racks, and some measure of cubic feet or pallet positions for floor stock. Other storage media may need custom space calculations.
- Sales information (ideally number of units sold and number of orders with that SKU over the past 12 months)
- Bin location coding (aisle, bay, level) for each storage location in the facility

Once your team has done all the preceding steps, they are ready to finish the analysis by slotting each SKU.

Velocity Analysis

We begin the slotting process by assigning velocities to each SKU. We take the SKU-level data and sort it based on the sales information from highest-moving items to the lowest. We typically calculate the percent of times picked of a particular SKU out of the total for that size classification (e.g., we had a total of 10,000 picks with a medium classification. Our top mover sold 1500 times (lines), therefore, that SKU is responsible for 15% of our total “Medium” sales). The calculation is simple, but we find it is a very powerful way to identify how many of our picks are coming from a specific product.

Within each size classification we start at the top and identify the fastest moving products and assign the V1 classification to up to the top 10% of SKUs. A good rule of thumb is to cover the top 50% of lines picked, which is often a very short list of SKUs. These top moving products will eventually be slotted into the very best locations in the warehouse for their storage type. The “best” location will require the least amount of move-time to pick and pack or stage the item. We then assign the next set of highest movers to the V2 classification – This category typically includes at least twice as many SKUs as the V1 classification and may cover the top 90% of lines. We typically find that the remainder of the products fall into the V3 classification. These are the slowest movers that will be stored wherever it makes sense on move day.

Using the process above allows us to quickly see the Pareto Principle in action as we often see just less than 10 products carry 40% of the total lines picked in a specific size classification. Because we may be dealing with thousands of SKUs, this gives us a straightforward way to group the products and efficiently move to the actual slotting.

Slotting the SKUs

After we have identified our V1 items within each size category, we begin the process of slotting the SKUs. We start by choosing a size classification (Example: XL, Large, Medium, Small) to start with and pick out the highest velocity item in that class. We then ask the team “Where should we slot this item?” What follows is typically a lively discussion of what defines the best available position in the warehouse for this item. Some examples of what is considered include:

- How much space has this item needed in the past based on maximum inventory levels?

- Should we place backstock of certain SKUs in a less desirable location instead of all in one location.
- How much space will this item need in the future based on projected inventory levels?
- Where is the next best available bin location for this type of product that is closest to the center of gravity?
- Is this moved by hand, pallet-truck, fork-truck or reach-truck needed?
- Can this be moved by hand when the person picking is up high in a stock picker?
- There will be additional questions asked based on your products

After the first item has been slotted, we move onto the second highest velocity item in the same size classification. As the team moves down the list, we begin to ask some slightly different questions:

- Is it easier to pick from further away but on the ground, or higher up and closer to the center of gravity?
- Are the neighboring products easy to confuse with this one?
- Does this SKU have any “frequently picked together” related SKUs?

Most of our clients can identify specific bin locations for all the V1 items. In some cases, we also slot some or all the V2 items. Typically, our clients choose to slot V3 items using their WMS during the move. Slotting V3 and some V2 items during the move is practical because it is very difficult to get SKU sizing and spacing completely accurate. Slotting V3 and some V2 items during the move allows for flexibility (wiggle room) in sizing of items and space allocation of storage media (floor stock, racking, shelving).

Completing the Analysis and the Move

Once the team has slotted the V1 and possibly V2 items for a single size classification, they move on to the next classification. By splitting the slotting by size, we are able to ensure that we prioritize both the number of times an item is picked and how difficult it is to do so. We want the least movement of the combination of velocity and items size.

After the team has slotted as many items as is worth the effort, our Clients are able to finalize their move plans and wait for the day / week of the move. During the move we recommend our clients label (e.g., place a colored dot) on V1/V2/V3 items. This allows the team to ensure they place the highest velocity items into their slotted locations first, the next highest velocity (V2) items second and the remaining space is used to slot the lowest velocity (V3) items.

Sustainment

In principle, as soon as you complete the analysis and the move, your velocity data begins to get stale as some top sellers decrease in popularity and others begin selling more. We recommend re-assessing annually. As with any process, maintenance is key to achieving the best possible warehouse efficiency. However, the effort has to be worth the efficiency gains.