Successful Warehouse Slotting

Increased ROI using the right tools, strategy and management plan

Warehouse slotting, in simple terms, is the assignment of the proper item to the proper location, depending on slotting criteria. To slot the right item to the right location may involve hundreds of permutations among the item, its attributes and location storage medium types. The features and benefits of a successful warehouse slotting plan are discussed here.

Slotting a very complex modeling exercise that drives warehouse efficiencies, including labor, space, and cycle times. The objective of a slotting plan is to fully realize attainable cost and space saving.

Why Slot a Warehouse?

The primary reason to engage in a warehouse slotting project is cost savings in the form of labor and space. Slotting represents the fine-tuning of the warehouse. If the warehouse is a new design, slotting is an integral part of the engineered design and implementation. Slot types and sizes need to be calculated for rack configuration and items need to be assigned their new locations based on a slotting strategy.

If the warehouse has been in operation for several years, the slotting is probably out of date, as SKU and order profiles change through the course of the product life cycle and both the rack configuration and the item slotting strategy become outdated. This gradually causes inefficiency, and efficiency costs money — more and more over time.

Essential Elements of a Slotting Plan

- Strategy
- Tools and Analysis
- Criteria
- Ranking
- Implementation
- Re-slotting

These elements will now be discussed in greater detail.

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Strategy

The first element of success in a slotting project is strategy — a slotting strategy is the "high-level roadmap" to a major or minor slotting project. The strategy keeps the project focused and on track. Slotting is very complex and somewhat difficult to implement. A high-level plan at the very start of the project will greatly improve the attainable success level of the project and should include some of the following details:

- Project scope and objectives
- Short- and long-range facility planning
- Assumptions
- Timeline
- Project organization

Of particular importance at this point is to answer a few strategic questions:

- Is there a building expansion planned in the one-to three-year timeframe?
- Is significant rack reconfiguration an option?
- When can the slotting plan implementation start?

Answers to these questions and others relevant to the project will help guide the final slotting plan.

Tools and Analysis

Several tools and analysis are needed to perform warehouse slotting.

Material Flow Documentation — flow charts and process documentation that describe the flow of the product through the warehouse, including picking, putaway, and replenishment methods.

Material Flow Data — data analyses that describes SKU dimensions, unit and cube throughput, velocity profiles, order profiles and order commonality, and all peculiar item data as needed. enVista utilizes the Material Flow Analysis (MFA) Modeling Tool to produce most of the required analyses.

Warehouse Configuration — includes facility CAD layouts, rack elevation layouts, and quantities of existing slot types.

Modeling Tools — essential in order to build the material flow analysis described above and to produce the final slotting plan from the slotting criteria listed below. Modeling tools may be a simple combination of Access database and advanced Excel spreadsheets (or equivalent), or may take on a more sophisticated form such as a slotting module within a WMS or a stand-alone slotting program.

Slotting Criteria

Slotting criteria includes slot type, ABC velocity rating, and additional criteria (identified below). ABC velocity is the most commonly used slotting criteria; however, it is very short-sighted to not analyze and recommend slot type based on cube throughput analysis. Additional criteria are peculiar variables applicable to a particular operation or product mix.

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Slot Type

Slot type defines the type and dimensions of a storage medium. Typical slot types include shelving, decked rack, case flow, pallet rack, and pallet flow of varying dimensions. Slot type is critical to slotting for space, equipment, replenishment and picking considerations.

In a primary pick model, the number of replenishments is a function of item cube, throughput, and storage cube size. An undersized pick face will cause excessive replenishment, resulting in higher operating costs. An oversized pick face is a waste of space and the resulting operating cost of the space. An oversized pick face, in most cases, will also introduce picking inefficiencies in the form of additional travel time. A balance should be sought between replenishment and picking labor cost, space available and cost.

Additionally, slot type is a factor in the pick rate. The overall cumulative slot type profile is more or less relative toward a higher density or lower density pick zone. A high-density pick zone is more efficient for picking, but will hold less product. A low density pick zone will require greater travel distance, and therefore, is less efficient for picking, but will hold more product. This is the third variable to factor into the equation.

To determine slot type, use the output from the material flow analysis and warehouse configuration information, both current and proposed, to determine a slot type by item. This then becomes the primary slotting criteria.

ABC Velocity Rating

The ABC velocity rating is output from the material flow analysis. The output represents an ABC rating for each SKU with "A" representing fast movers and "C" representing slow movers in terms of "hits" or "lines per day."

Velocity slotting primarily reduces travel time. The objective is to minimize the pick path or travel distance required to pick an order, a cluster of orders, or a batch. This is done by grouping product by ABC rating, with an "A" representing the fastest moving items in the warehouse, and "C" the slowest. Additional ratings are usually added for very slow "D" items. ABC slotting is combined with slot type and order commonality (discussed below) to balance labor and space costs and produce the optimal slot plan.

Additional Criteria

- Order commonality is a group of items likely to ship together on the same order. This group is then slotted together or close by within a specific slotting zone.
- Base product applies to picking-to-pallet. In a pick-to-pallet using an order picker, pallet jack or lift truck, the challenge is to build the pallet while picking and avoid the double handling of pallet rebuild and/or consolidation at the shipping dock. In this slotting criteria, the base product that is the heaviest and/or bulkiest is placed first within the pick path. The slotting may have intermediate zones, but, in any case, the lighter and/or smaller product ends up on the top of the pallet. If base is a criterion, it is usually the primary slotting criterion and all others, including velocity, are subordinate.
- Source slotting or slotting by vendor is sometimes used to help minimize putaway labor by grouping items together from the same vendor. This applies more to mixed-pallet receiving.
- Customer slotting refers to grouping items together that are more or less customer

specific. These may be picked together in close proximity to fill a significant portion of the order.

- Slotting by product type strives to place similar product together, primarily as a way to organize the warehouse — especially one containing many SKUs. This is closely related to source slotting, but considers many sources for a product type or group.
- Special storage requirements may include temperature control and environmental controls, hazardous material controls, oversized items, special packaging requirements, etc. These criteria must be taken separately and handled as well as possible.

Ranking

Criteria ranking is the primary slotting criterion and will take on the most significance. The second and third slotting criteria will also be important. However, after that, slotting variables become exceptions, because more than two or three slotting variables cannot be incorporated into a single slotting equation. Additional variables must be removed from the equation and handled as exceptions. So deciding on the ranking of the variables is of highest importance to realize the most from the exercise.

Implementation

The strategy, tools and criteria together facilitate the output of a slotting plan. The final section to a slotting plan is the implementation plan. A well-designed slotting plan is usually not easily implemented and bears a risk of sitting on the shelf until it is out of date. A well-crafted implementation plan greatly improves the odds of success — that the slotting plan will be fully implemented.

Reslotting

Finally, a slotting plan lasts only so long. As new product is introduced, SKU profiles change and order profiles change until efficiencies in labor and space start to erode. Reslotting on a timely basis is critical. Once the initial slotting plan is implemented, reslotting is much easier as it is more of a tweak and requires less change. However, if reslotting is not done periodically, not only does the operation suffer in terms of lost efficiencies, but when the reslotting is done, it will be a major exercise.

A critical tool in reslotting is a labor management system (LMS). A LMS that is properly integrated to the slotting system will provide information needed to determine if components of the slot plan are justified in terms of the labor performance. For example,

a slot plan output from the slotting system may recommend certain moves, based on the slotting rules, but are the moves worth the effort? Since most of the time used in picking activities is spent in travel, associate performance can be increased by reducing this travel distance by reslotting. These days an LMS can capture associated costs because of the distance between locations, so a reslot can be proved to lower labor costs and increase associate productivity by simulating this new "map." An LMS will provide additional data in terms of the resulting savings from the recommended moves as well.

Summary

Success occurs when a slotting plan is implemented and when benefits are being realized. Success first indicates that the slotting plan was implemented. Secondly, that the benefits of slotting are being achieved. Benefits are summarized as follows:

- **Space maximization.** Utilizing the recommended slot sizes helps to maximize the warehouse cube, thereby cutting the square footage requirements.
- **Picking efficiencies.** ABC Velocity slotting, as well as order commonality slotting, reduces travel time. Slot size profile also contributes to picking efficiencies in terms of high-density versus low-density pick paths.
- **Reduced replenishment.** Replenishment to the primary pick location is usually labor intensive in less than full-pallet quantities.

A balance must be attained between replenishment rate, which is a labor cost, and cube size, which is a space and equipment cost, and usually affects labor (pick rate) as well.

- **Putaway efficiencies.** Putaway from receiving should be considered as part of the labor equation. However, it is generally a secondary consideration to picking and replenishment.

Return on investment (ROI) depends on the type of slotting being performed, such as a new warehouse versus an existing warehouse. ROI can, however, be significant, especially when the right slotting tools, strategy, and management plan are utilized.

This article is authored by Mike Patterson, a Project Manager at enVista. For more information, contact us at 877-684-7700 or via email at inforequest@envistacorp.com.

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