

## Think You Have Warehouse Problems? Try Slotting Pet Fish.

No matter how challenging your products, there are slotting techniques to help you increase space utilization, reduce labor costs and increase throughput.

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***BAD slotting***

***GOOD slotting***



St. Onge has slotted many warehouse facilities for many different industries. Each one is unique and has its own criteria and objectives for consideration. One of our most challenging projects was slotting a live pet fish warehouse.

There are always constraints to deal with in slotting a warehouse, but here we had to address the handling and storage of food products. Just a couple of the issues we had to consider were the fact that certain food types shouldn't be stored together and that several of them come with temperature considerations.

With the handling of live pet fish, there are multiple tank sizes, temperatures and water care issues (fresh vs. salt for example). Still, like any set of products, there are going to be fast movers and slower movers. But with live fish, an additional constraint is the fact that certain fish will eat others. Another is that fish can die during the shipping process, if not properly packaged and contained within the shipment packaging.

If you thought your slotting criteria were too complex for modeling an optimum solution, I hope this example changes your mind.

This article explores the potential for slotting optimization within any warehouse operation.

Effective slotting leads to improved warehousing, including increased space utilization, reduced labor costs, and increased throughput. In many operations, improving slotting alone can increase picker productivity more than 25%, which might be a better decision than adding advanced technologies such as pick-to-light or voice picking. However, if product slotting is poor and improvements are not integrated into an advanced pick technology solution, the expected benefits may not be realized.

Product slotting involves the selection of location types/sizes and ends with assigning a product to the most efficient and effective location. In many distribution centers, a separate or forward picking area is set-up to process orders and a reserve storage area is used for replenishment. In this design, the greatest opportunity for efficient product slotting is in the forward picking area where the highest percentage of labor cost is incurred (over 40% in most distribution centers). There are opportunities for product slotting in the reserve storage area, but this article is based on the forward picking area.

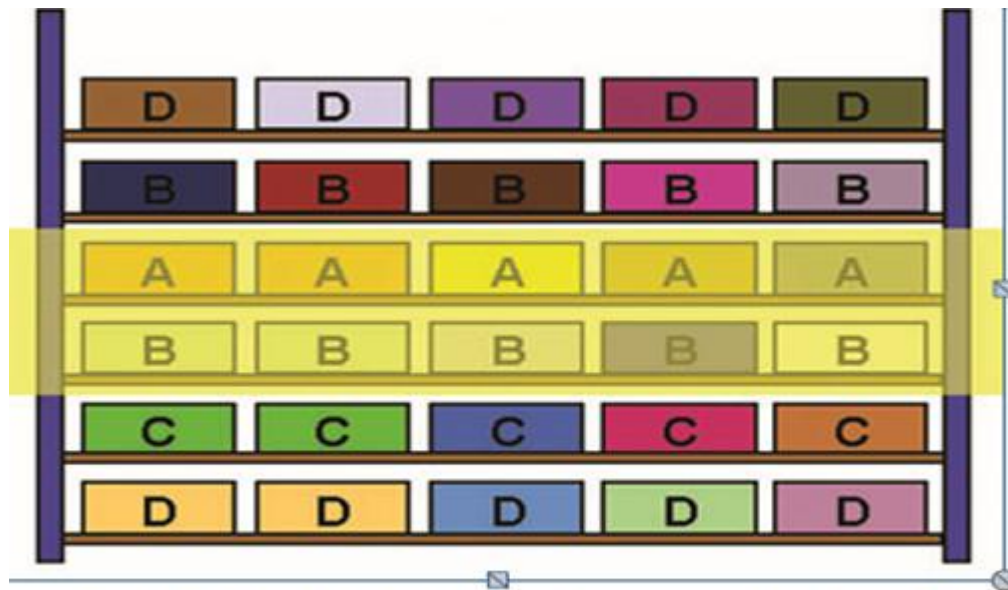
### **Slotting Criteria**

There are many criteria to consider when optimizing the slotting of your products. Most of these slotting criteria will exist in every forward picking area operation:

- Satisfy customer requirements
- Increase picker productivity
- Prevent pick location stock outs
- Reduce replenishment labor costs
- Satisfy OSHA requirements
- Reduce product damage
- Reduce picker injuries
- Maximize space utilization

Establishing an efficient product slotting system in the picking area increases throughput and reduces picking and replenishing labor costs. In addition, effective product slotting leads to fewer injuries, improved space utilization and reduced product damage. Within given customer zoning, product family storage requirements, and OSHA requirements, the key factors in slotting choices include: line velocity/order commonality, cubic velocity, and product characteristics.

## Product Line Velocity / Order Commonality



**High Line Velocity = Ergonomic Level**

Product line velocity refers to the number of trips to a product's location. The products visited most often should be located on the most ergonomic picking level and be arranged to reduce travel distances. However, these items should also be effectively balanced across aisles and/or bays to reduce operator and product congestion. The consideration of slotting items frequently picked together, close to one another is also a key slotting consideration. Integrating both individual product activities, along with order commonality can be tricky, but leads to big order cycle time reduction. The results of the line velocity analysis and consideration of order commonality impact slotting decisions regarding zones and methods, whether a product is picked from reserve storage (slow moving), layout/travel distances, and pick level assignments (ergonomics).

## Product Cubic Velocity

The product cubic velocity refers to the amount of product picked from a location. This is calculated by multiplying the quantity picked by the product's cubic dimension. An important use of the cubic velocity is calculating the size and number of locations required for each product. This is also used to define the pick unit-of-measure as piece, full case and/or full pallet picks.

**Bin and Static Shelving**



**Carton Flow Rack**



The desired days-on-hand per location is a critical component in defining these requirements. The minimum days on hand for a forward picking area should be 5-days. The location size is based on satisfying the days-on-hand and the products dimensions. The days-on-hand value is multiplied by the cubic velocity/day to calculate the cubic feet of inventory to be stored in a pick location. This value is divided by the cube of the assigned location to calculate the number of locations required. The results of the cubic velocity impacts slotting decisions regarding pick unit-of-measure, equipment selection/capacity, and the location size and quantity.

## Product Characteristics



As mentioned, the product dimensions play a big role in calculating the cubic velocity. Other product characteristics that impact slotting include stackability and weight. Stackability within the picking location and during picking (onto a pallet) should be factored into slotting to reduce damage. The heavier products should be picked first, so that they are placed on the bottom of the pallet. The product weight impacts the pick level assignment for ergonomic reasons and positioning in the pick path to reduce damage. The product's dimensions are by far the most critical characteristic in order to utilize advanced slotting tools. If you don't have your product dimensions, then renting a [cubiscan](#) (or similar product) can assist in collecting the information.

## Summary

The complexity of your slotting situation could range from handling of live fish to products with no shelf life. Either way, a lot of analysis is required to define the right slotting assignments. To summarize, the major benefits of product slotting are increased throughput, reduced labor costs, and increased space utilization. The key ingredients to achieving these benefits include the following:

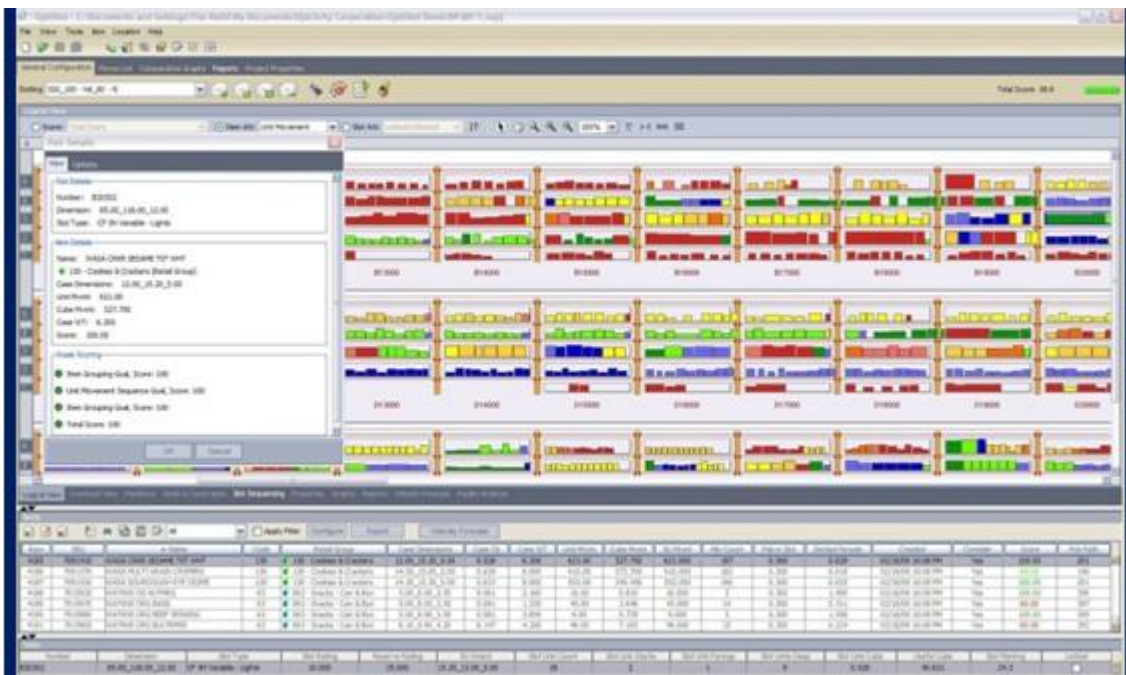
- Assigning fast movers to the most ergonomic level
- Placing heavy products on the most ergonomic level
- Reducing travel distance to fast movers
- Balancing the fast movers across aisles/bays to reduce congestion
- Picking very slow movers from reserve storage
- Sizing locations to satisfy required days-on-hand



- Sizing locations to reduce stock-outs
- Maximizing the location cube, resulting in less space required
- Arranging products based on stackability (for pallet building); and
- Developing effective picking zones (category, customer, temperature, etc.)

Slotting assignments must be reviewed for effectiveness as new products are added and as the activity of products changes with seasonality. This may be daily, weekly, or monthly based on your product mix. The product slotting analysis can be done manually or be supported by a software program. As a rule-of-thumb, you might consider a software program to support your slotting efforts if your operation meets more than two of the following criteria:

- Have many products and changing product mix;
- A variety of product dimension and weights;
- Currently using multiple pick equipment types;
- Experiences fast to slow product activity;
- High order activity; and/or
- Currently using a forward picking area.



Effective layout and slotting of products within your distribution facility is the key to improved warehousing. Developing an intelligent layout and slotting solution can make the difference between an efficient, cost effective facility and one that becomes a financial burden. Product slotting is an untapped opportunity in many operations, but with simple

strategy changes great improvements can be discovered. Before investing in advanced technology within your picking area, make sure the product slotting strategy is an integrated part of the solution.

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