

Storage Media Allocation in a Constantly Changing World

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When a company handles many thousands of Stock Keeping Units (SKUs), of widely disparate shapes and sizes, allocating appropriate storage media and picking methods can be a challenge. Today's market offers a very wide range of storage media, but determining the most cost effective combination for your storage and picking needs takes skill.

Most warehouses require both bulk storage and picking faces, unless the complete stock can be held at the pick face. Density of storage is one of the key criteria for efficient, cost effective storage. For bulk storage, Adjustable Pallet Racking (APR) and longspan shelving are most commonly used, while denser storage can be provided by using double or multiple depth pallet storage.

Shelving of different depths and carton live storage are frequently deployed as pick faces. Using various sizes of tote bins can provide a flexible means of achieving maximum density for small items on shelving. Alternatively, vertical or horizontal carousels could be used. In order to maximise the efficiency of storage, it is crucial that the product profiles of the items stored in a specific storage medium are appropriate. The storage medium allocated to a product must satisfy both its storage and picking needs.

When a new warehouse is designed, data on the current range of products should be analysed to determine the best layout. For each SKU, the volume of stock to be accommodated, the physical dimensions of the item, case and pallet dimensions, quantity held and any special characteristics of the products must be gathered. Next, the order profile is defined, to ascertain the picking profile of each product. Finally, future growth is applied to allow space for expansion.

Rarely will a warehouse or distribution centre, in today's lean supply chains, have unlimited funds. Cost should therefore be the prime driver for any choice of storage media. The complete cost of each storage medium and picking method considered should be analysed and the most cost effective overall solution implemented.



2D imaging aids new warehouse design

Ideally, many different options should be compared to determine the best fit for both storage and picking requirements. Key elements of the overall cost of each storage medium that must be assessed are the following:

- Capital cost per location of each storage medium
- Picking and Replenishment costs including equipment and crewing for each different type of bulk and pick face
- Facility costs including rates, heating lighting and power that should be apportioned to each storage medium

Equally important, for accurate assessment, are the physical properties of each product and storage type.

For example:

- Physical constraints of each location type
- Physical dimensions and characteristics of each SKU
- Demand profile of each SKU

Using the above data, costs of each bulk and picking storage medium and movements between different media can be determined and compared. Total Logistics has developed a range of spreadsheet based models to facilitate this type of analysis. In particular, we have used our Storage Allocation Model (SAM) to assist many companies who do not have the in house resource to carry out this level of analysis.

From this analysis, the ideal layout for both bulk and picking can be designed and a pragmatic review will distil the ideal into the practical layout for implementation. Each SKU will be allocated a suitable pick face and, if required, a bulk location to meet their needs at implementation. The practical layout will also take into account the balance of work across the whole warehouse to ensure that all products can be accessed effectively.

However, few warehouse layouts can afford to remain static. Optimising the layout throughout the life of the warehouse requires constant maintenance. Some key drivers for improvements in storage density or picking are changes in:

- SKU range - Your company may acquire a complete new range of products that demands re-organisation of the whole warehouse.
- Demand profile - Demand for a SKU could reduce dramatically, causing inefficient use of the allocated storage media.
- Product packaging - Changes in packaging can wreak havoc if size varies significantly and a different storage medium is required.
- Product obsolescence - A sound stock clearance policy is essential and should be rigorously applied to liberate much needed space.
- Seasonality – The build up to Christmas, for example, can create considerable capacity challenges in a warehouse.

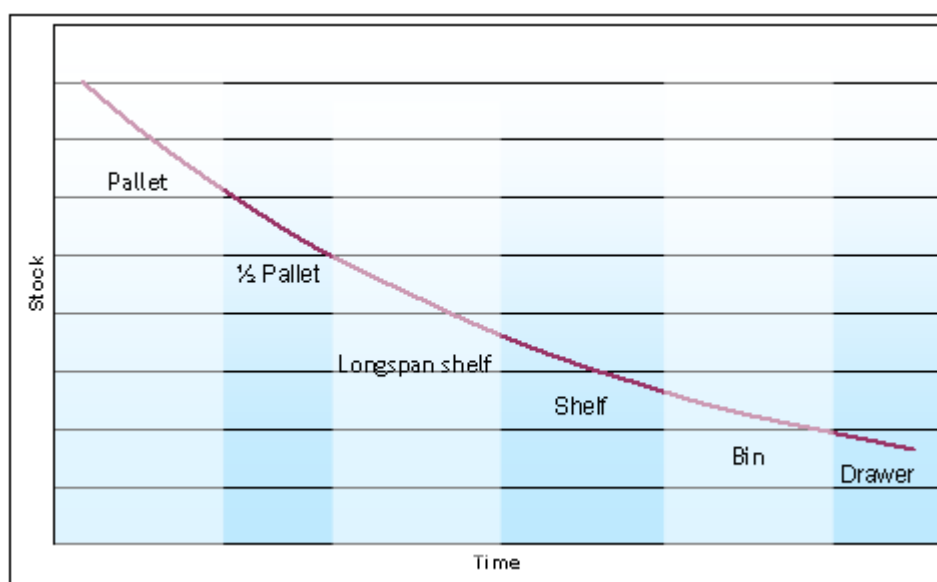


Figure 1: Changes in storage media over a product's life cycle

Each of the above can engender significant change and keeping pace with the effects of each factor requires constant, on-going maintenance of the warehouse layout. The challenge is to achieve maximum storage density coupled with efficient picking.

The graph in Figure 1 illustrates a product life-cycle with gradual reduction in stock and the densest storage medium appropriate to each change in the volume stored.

A product's life cycle may, theoretically, require pallet sized pick faces when initial demand is high. As volume decreases, moving the product consecutively from a pallet location to a half-pallet to a longspan shelf, until it is eventually in a small drawer, before being discontinued, could be extremely costly.

Where space in the warehouse is in short supply, multiple re-locations of those SKUs with rapidly changing storage requirements may be necessitated in order to optimise the use of available space. For the fastest moving products, or those with constant, steady demand, there should be no need for re-location, but those products which gradually reduce in demand, as illustrated in Figure 1, should certainly be considered. However, a balance must be achieved between the cost of storage and handling and the cost of product re-location within the warehouse.

The effects of seasonality are shown in Figure 2 which illustrates the volatile life cycles of a number of different SKUs with similar physical size and profile.

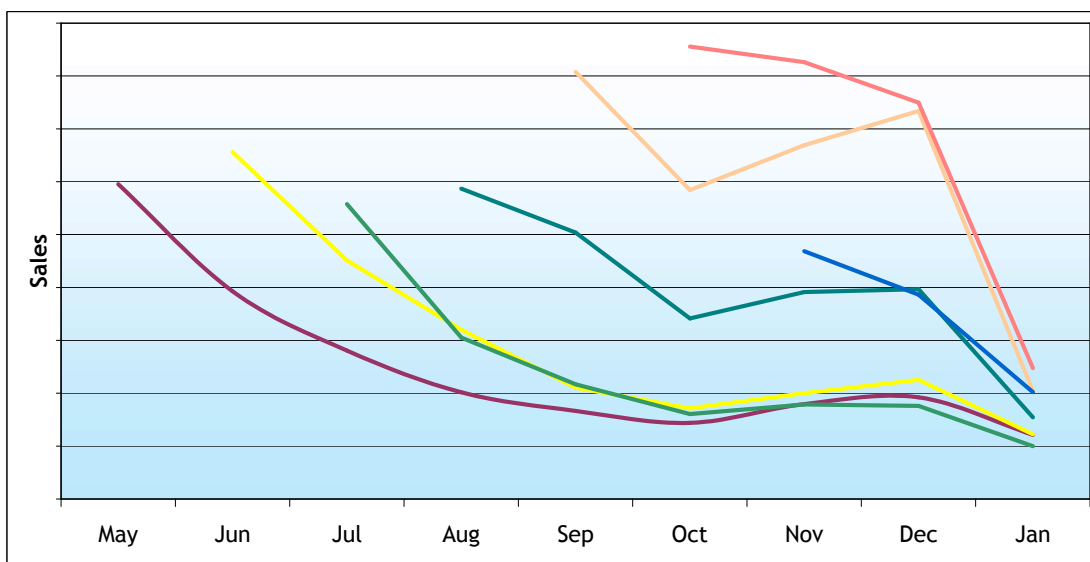


Figure 2: Volatility of product life cycles

The graph in Figure 2 shows initial high demand for each SKU at introduction followed by decline in demand and a seasonal increase in demand of all the SKUs at Christmas. The complexity of allocating appropriate storage for every SKU in the warehouse throughout its life is clearly illustrated by the significant variations in life span and sales volume for each of these SKUs.

The implication is that this warehouse will have to allow for increased stock, overall, to meet the Christmas peak but each individual SKU will have to be assessed to achieve the correct balance of storage media. For example, if each SKU requires a pallet location at its peak demand, but by January requires only a tote bin location, determining when to “downsize” each pick location may be key to accommodating the pre-Christmas stock build in the warehouse, without resorting to potentially costly outside storage or multiple movement of a SKU. Understanding each SKU's profile is therefore critical to re-locating stock.

A re-location movement can be justified provided the difference in the overall costs for two alternative storage media and their associated picking methods is greater than the movement cost from one to the other.

In conclusion, a warehouse or distribution centre should start its life with a well designed layout that takes into account storage density, picking efficiency and overall handling costs. Maximising storage density and picking efficiency requires regular, cost effective optimisation of the storage media to which each SKU is allocated.