THE OVERVIEW OF DISTRIBUTION CENTER (EFFECTIVE SPACE LOCATION) OF FMCG MANUFACTURING UNIT

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ABSTRACT

This paper gives an overview of Distribution center (Effective Space Location) of FMCG Manufacturing Unit. We ensuring that the customer gets the perfect order- that is, the right product, at the right time, at the right place, with the right documentation and of course it must be delivered in the most cost effective way. Greater attention must be given to how the distribution center manager two of its most important assets- inventory and warehouse space. These responsibilities are the focuses this paper. The challenge in space allocation is to determine the most effective row depth for rotating, picking and replenishing, longer rows require fewer aislers which mean more space for storage. With a market that is more complex and industry that is more competitive however effective space location is not so simple. In current situation Effective Space location is the major challenge of FMCG Manufacturing unit, day to day volume of FMCG unit will increase, but storage space was not increased, in this paper we focus on the how to utilize maximum space for maximum storage of finished product. Till time every Shipping dept. of any FMCG manufacturing unit faced the major problem of space.

INTRODUCTION

The important of distribution as a competitive advantage for any company, this competitive advantage can be achieved only through a careful balance of customer service and efficient distribution operations. The balance is especially critical in the distribution center, because it is the focal point of all activity that begins when the product leaves the production line and ends at the customer.

The perfect order- All activity in the distribution center should focus on ensuring that the customer gets the perfect order- that is, the right product, at the right time, at the right place, with the right document. And, of course, it must be delivered in the most cost effective way.

The push approach- To deliver the perfect order, the production distribution network is shifting from the "push" approach to the "pull" approach. In the push approach, the focus is on maximizing production assets and efficiencies. As a result, manufacturing costs may be low, but total distribution costs increases because the distribution center may need to hold extra inventory and the customer' needs may not always be met.

The pull approach- The emphasis on the perfect order, however, means first determining what the customer needs, and then adjusting the production distribution network to provide the products and services when they are needed. This is the customer pull approach.

Effect on Distribution- for the distribution center, the shift from push to pull means greater variety of products, smaller inventory of each product, more frequent replenishment, and increased fluctuations in volume and velocity brought on by seasonal changes, holidays, special events, and promotions. Managing this shift requires more frequent and accurate communication between sales, production and distribution. And greater attention must be given to how the distribution center manages two of its most important assets- inventory and warehouse space. These responsibilities are the focus of this module.

INVENTORY BASICS

To manage inventory effectively, you need two basics

- A way to identify and track inventory items, and
- A way to group those items by sales volume.

Stock keeping units- the most effective way to identify and track inventory is with the stock keeping unit, or SKU. An SKU is an identification code given to each salable item. When all items are assigned SKUs, inventory is easier to track and manage. Each SKU is made up of a product in its primary, secondary and perhaps tertiary packaging. Each variation of packaging is an SKU. For instance, the distribution center may handle a primary package of 12- ounce cans. The cans are put into the secondary package, for instance a 6- pack hi cone. These 6- packs may be put into a cardboard tray, which is the tertiary package. However, the distribution center may also handle bottle in the primary package. Then 12 bottles are put into a plastic crate, which is the secondary a plastic crate, which is the secondary package. This is no tertiary package.

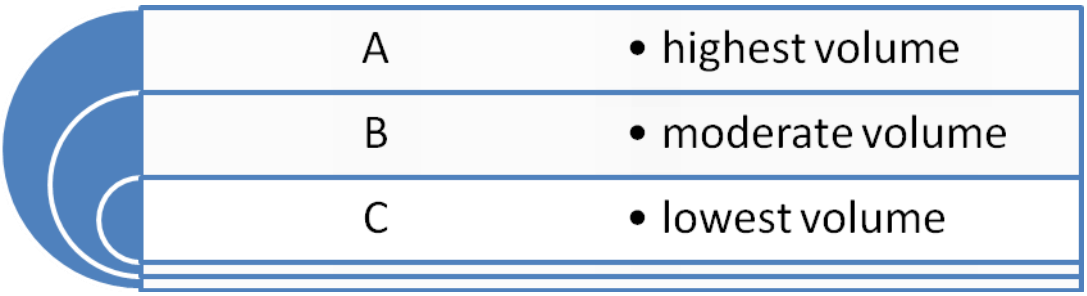
ABC VOLUME ANALYSIS

Volume analysis- The SKU tells you what individual salable items you have in the distribution center. But you also need to know the volume of each SKU you will handle.

Sales forecast- The sales forecast helps you anticipate this gross volume, typically by month or week. It lists the volume of all products to be sold, anticipated promotions, and new product introductions.

Total volume- using this information, you can group your SKUs into categories by volume. This is known as an ABC volume analysis. Start with the total annual sales volume and group the SKUs into high, moderate, and low sales volumes.

- The highest volume SKUs are the A items.
- The moderate volume SKUs are B items.
- And the lowest volumes SKUs are the C items.



As a general rule, the A items constitute about 20 percent of the SKUs in a distribution center and 80 percent of the volume. The B and C items amount to about 80 percent of the SKUs and 20 percent of the volume.

EFFECTIVE SPACE ALLOCATION

The ABC volume analysis is important for managing your inventory flow. But it is also important for planning how to allocate space in your distribution center warehouse. The goal of space allocation, of course, is to maximize storage and minimize travel distance of the product within the warehouse, because more efficient storage will reduce product handling. This result in increased efficiencies and less product damage. For the purposes of adjusting layout, you can think of the typical warehouse as being divided into four areas- structural, activity, storage and traffic.

STRUCTURAL AREAS

A good approach to planning the layout for an existing warehouse is to draw a diagram of the empty warehouse. First, locate the structural features of the building, that is, those areas that cannot be easily changed. For instance, indicate on your layout the outer walls, the columns, and any other non- movable areas, such as administrative offices. Dock doors and entrances are also part of the basic structure of the building. The sizes and shapes of these areas differ depending upon whether the trucks are loaded inside or outside the building, or whether the building has loading docks. In the example, the trucks are loaded outside the building.

ACTIVITY AREAS

Next, determine locations for all activities that require floor space. These activities include receiving and shipping, building pallets with a mix of product, sorting empties and returns, and performing maintenance. In both the receiving and shipping areas you need a clear and unobstructed space for forklifts to unload or load trucks, make turns, and maintain a safe traffic flow. In the shipping area, you also need to allow for a staging area where product can be temporarily placed before it is loaded onto the truck. As the number of SKUs increases, the warehouse will build more mixed pallets. This is the next area that should be identified when creating an efficient layout. A mixed pallet is made up of multiple SKUs, to accommodate orders

for a designated route. For warehouse with a large number of SKUs, more than 80 percent of pallets shipped are mixed, or hand- builds, pallets. But even when the percentage is not this high, adequate space must be allocated for staging and building mixed pallets. The area must have enough floor space to stage full pallets of each SKU and to build the mixed pallets. The size of this area depends, of course, upon the number of SKUs used to create the mixed pallets. For order pickers to build mixed pallets efficiently, they must be able to access product easily and fill orders quickly without damaging the product or injuring themselves. Pallets of various SKUs can be arranged in a number of ways. The most common arrangement is a straight line of full pallets. The mixed pallets are built as the order picker walks down the row, pulls product, and places it on a pallet. This configuration works very well when the warehouse handles only a small number of SKUs. As the number of SKUs increase, different mixed pallet configurations may be used. For instance, the pallets may be arranged in two rows on either side of a picking aisle. Two order picking are able to move down the picking aisle and load product onto pallets. If space is limited, a U-shaped configuration may be used. The full pallets form a U, and another row of product, usually A items, is arranged in the center. The order picker has easy access to every SKU. Another option is to use two rows, with one or both of them having a U-shape in the middle. This gives the order picker easy access to even more products. Regardless of the configuration, the objective is to create a flow that is efficient. This means the mixed pallet area should maximize the number of cases a person can handle per hour and it should be located close to the shipping area. If you are in a market with refillable containers, you must allocate space for sorting and storing the empties.

If the climate is suitable, the storage space for empties may be outside the warehouse building. However, before making this decision, you need to consider the types of refillable bottles you handle. For instance, REFPET bottles should not stored outside in direct sunlight or in very dusty conditions. In addition, you may also need space to store product that has been returned because of an expired date code or damage. This product has to be stored until it can be disposed of in the appropriate way. The warehouse may also be responsible for taking returned empties that are to be recycled. If this area is within the warehouse, it needs to be indicated on the layout. To help ensure a smooth traffic flow, try to locate the empties and returns areas where the containers can be unloaded from the truck before it reaches the shipping area. Finally, locate the maintenance area where batteries are changed and repairs are made to the forklifts. After we had indicated all of these activity areas, we are ready to determine where to store the full pallets of product.

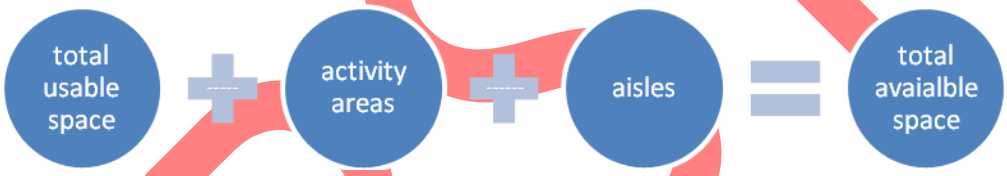
STORAGE SPACE

The largest percentage of the warehouse space is allocated to full pallets, that is, to pallets that contain only one SKU. The major effort in readjusting the warehouse layout is to determine where full pallets of product should be located. As the number of SKUs increases, it may seem more difficult to create an efficient plan to locate full pallets of product. However, with the

appropriate information from the sales forecast and production plan, you can allocate space for full pallets to achieve maximum storage and picking efficiency. Here is one approach

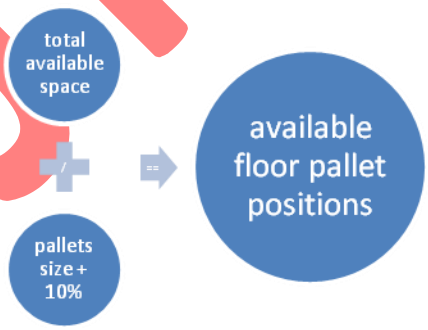
- First, estimate the total space available for full pallets.
- Then, for each SKU determine the average daily inventory you expect to have on hand in the warehouse.
- Determine how many floor pallet positions you will need to handle the inventory you expect.
- Use the result of your ABC analysis to determine where to put each category of product
- And, before finalizing your plan, take into consideration the need for product rotation.

Once you have this information, you can decide where to put the SKUs and how much floor space to allot to each. To estimate the storage space needed for full pallet s, subtract the space devoted to activities from the total usable square meters of the warehouse. Then, deduct an additional percentage, usually around 20 percent, for aisles. The result usually represents about 50 percent of your total available space.



Total usable space – Activity areas – Aisles = Total available space

Next, divide the number of square meters of total available space by the standard pallets size, expressed in square meters. Add an allowance of approximately 10 percent for clearance between pallets. This gives you the total number of floor pallet positions available.



Total available space / pallets size+ 10% = Available floor pallet positions

For example of FMCG manufacturing unit, suppose the total available storage space is 7,000 square meters, and the pallet size is 1 meter by 1.2 meters, or 1.2 square meters. Allowing an additional 10 percent for clearance gives 1.3 square meters for each pallet. Using the formula, you determine that 5,385 floor pallet positions are available.

Average cases sold per day * days of inventory = Average daily inventory on hand

The next step in allocating space is to determine for each SKU the average inventory you want on hand in the warehouse. You do this by multiplying the average number of cases you expect to sell per day by the days of inventory you plan to carry for this SKU. The average daily sales can be derived from the sales forecast. For example, we except to sell 13,500 cases of SKU 148 each day, Days of inventory are usually determined in the production planning meeting. Here you work out how much safety stock you need of each SKU, and you balance your inventory needs with production capabilities. The example has 2.5 days of inventory. Using the formula given above, multiply 13,500 by 2.5 the result is 33,750 cases, which is the average daily inventory you expect to have on hand for this SKU.

Before you can place the product in the warehouse, you need to know how many floor pallet positions are required for 33,750 cases of the SKU. To determine this, you need to know the number of pallets and the pallet stacking height.

Average inventory on hand / cases on pallet = number of pallets

To find the number of pallets, divide the total number of cases to be stored by number of cases to be stored by the number of cases on the pallet. For instance, if you are planning space for 33,750 cases and you have 36 cases on pallets, divide 33,750 by 36. You have to plan for 938 pallets of this SKU. You may also allow a percentage for unused row space, next consider pallet stacking height. For most pallets of company products, height is important and is affected by many factors, such as the stacking strength of the package. Some package, such as PET, can be damaged if they are not stacked properly. When determining pallet stacking height, you also need to consider the clearance height of consider the clearance height of the equipment. The forklifts must be able to stack and remove pallets without damaging them. To factor in pallet stacking height, divide the number of pallets by the number of pallets in a stack. The result is the number of floor pallet positions you need for this SKU. In example, pallets of 1.5 L PET can be stacked three high. When we divide 938 by 3, we get 313 floor pallet positions.

Number of pallets / pallets in stock = floor pallet positions needed

Follow the same process for all SKUs you expect to handle. By adding the floor pallet positions for all SKUs, you have the number of floor pallet positions you need for storage. Now compare this with floor pallet positions available to determine if you have enough space or if you need to adjust your inventory levels. Product rotation must also be considered when allocating space in the warehouse, because many of our products and packages have stringent freshness requirements. This is the reason production places freshness codes on packages and pallets. These codes must be checked daily and product rotated as needed. Several guidelines should be followed to ensure proper product rotation. The first one, of course, is first-in-first-out (FIFO). Always make sure that the first product into the warehouse is the first product out of the warehouse. The second is to replenish the rows in a systematic way, so you can ensure that the product is rotated efficiently and consistently. The third is to store rows of high volume packages six to nine pallet spaces deep and to store low volume packages in rows no deeper than five pallet spaces. This way you minimize the chance of product being buried in the back of a row and going over age. The challenge in space allocation is to determine the most effective row depth for rotating, picking and replenishing. Longer rows require fewer aisles, which mean more space for storage. However, they also mean more unused row space when a row is only partly full. This is called honeycombing. Once you have the number of pallet positions for all SKUs, you are ready to use your ABC analysis to identify the location for each SKU. As you do so,

keep in mind that you want to- minimize travel distance and minimize product handling. In the ABC volume analysis, you identified the A items, that is, those with the highest volume items and are moved through the warehouse the fastest, they should be placed the shortest travel time from the mixed pallet and shipping area. The B items then should be the next closest location. And the C items should be furthest from the shipping area, because they represent the smallest inventory and they are picked less frequently. Each category does not have to be kept in the exact same location. For instance, if both bottles and cans are A items, the cans may be separate from the bottles. However, they both need to be located near the shipping area. You may have to make several attempts before you find the best location and floor pallet positions for all ABCs.

TRAFFIC SPACE

Before finalizing your space allocation plans, you need to determine where aisles should go. A good aisle network provides a safe and efficient "road system" for the movement of people and materials. Equally important, it improves efficiency by dividing the storage space into manageable areas. The overriding guideline for aisles is this: whenever possible, maintain a one way flow of product through the warehouse. The ideal, of course, is to have product enter on one side of the building and exit on the other side. However when the receiving and shipping areas are adjacent to each other, as in the example, you can still maintain a one way flow of product through the warehouse. The aisles have to be able to accommodate certain types of activity. All aisles used for forklift travel should allow for constant two way movement. They should be wide enough for two loaded forklift to pass each other safely. Aisles used for picking must provide access to rows of full pallets the aisles should accommodate two way travels and allow a loaded forklift to make a 90 degree turn. The picking aisles should also allow room for replenishing from the rear. This means you have to leave enough room for a forklift to access both ends of the row. Or pallets can be pulled from one row, while a second row is being replenished. Then, pallets are pulled from the second row while the first is being replenished. This replenishment pattern means you have to allow enough room to have two forklifts next to each other. Walking, or pedestrian, aisles are for personnel only, and should allow two people to walk comfortably side by side, to take inventory, and to clean. In determining aisle locations, there are seven additional guidelines to follow:

- Aisles should be as straight as possible,
- The surface should be as smooth as possible,
- They should contain a minimum number of intersections,
- And they should intersect only at right angles.
- Aligned with the doors,
- Clearly market, and
- Unobstructed – whether by columns, low ceilings, or other structures.

Once you have identified your aisle space, your preliminary space, your preliminary space allocation diagram should be complete.

MAKING ADJUSTMENTS

After you have your preliminary layout, review and make adjustments. Depending upon your situation, you may need to consider other factors, such as large fluctuations in production, special requirements of trucks, and so forth. Of course, this plan will need to be reviewed regularly and adjustments made as you deal with the day to day reality of the production schedule and customer orders. However with a good plan, you should be able to accommodate any adjustments in space allocation. The distribution center needs to manage information effectively. It needs an accurate system of arrival, storage, freshness date code, and movement of products through the facility. This system may be as simple as a spreadsheet or as complex as a dispatching and route planning software program for the entire distribution process. Whatever system you use, it needs to keep track of full goods inventory by SKU, and track empties and returned product. However, if fluctuations are too extreme or you discover significant discrepancies between the forecasts and the actual orders, you should communicate with the production manger and perhaps with the sales and routing manager in the regular production planning meetings. Only through frequent feedback and communication can the distribution process be made more efficient.

OTHER CONSIDERATIONS

Once the layout has been adjusted and the space allocated, you can help protect your inventory by making sure clear signage, adequate lighting, and good housekeeping practices are in place. Signage is important for both safety and efficiency. Signage helps alert everyone to the traffic lanes, which minimizes the potential for forklift collisions and danger to pedestrians. Signage also helps forklift operators locate product more quickly. Marking the aisles with bright paint also helps alert people to traffic lanes and other areas that could be a safety hazard. Lighting is also important. It should be adequate for people to be able to easily read freshness date codes, pallet tickets, signage, and picking slips. It also improves safety, housekeeping, and overall work conditions. The distribution center should maintain housekeeping standards, just as the production facility does. Debris should be swept up regularly. Any product spillage should be cleaned up immediately. Doing so can improve safety, reduce product damage, and reduce problems with insects and rodents. A check should be made periodically to ensure that the inventory is properly stored and that package quality is maintained.

CONCLUSION

If the distribution center is to function with the maximum efficiency in a customer pull environment, it needs well managed inventory and appropriate space allocation. With the

foundation, the distribution center is prepared for two of its most critical activities- filling orders and loading trucks. These activities are the subject of another module. An efficient distribution center is vitally important in order to provide our customers with the quality beverage products they want, when and where they want them. It is a critical component of a system that ensures the customer receives the perfect order every time.

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