



# Distribution Center MANAGEMENT

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Managing people, materials and costs in the warehouse or DC

## From the Golden Zone

### Thorough analysis of your distribution processes is the basis of good DC design

By Geoff Sisko

The role of data gathering and analysis in the process of distribution design is increasingly crucial in developing the most efficient and economical DC layout.

What data should you analyze to design a typical warehouse or distribution center? Some of the many data profiles you need to collect and analyze include the following six areas:

#### Product characteristics

Product characteristics are the size and shape and weight of the product being stored and shipped in the DC. Use these to determine the types of storage methods and modules suitable for different products. For example, you can store palletized loads with good stackability on the floor or in pallet rack sections. Pallet loads with poor stackability, however, are not as suitable for floor storage since the available building clear height will not be fully used. Long loads such as steel bars and tubes are appropriate for storage in cantilever racks. Small items are best stored in bins, rack shelves, totes, storage cabinets, or similar equipment.

Product characteristics also influence the type of handling equipment you use. For example, long loads may require side loaders or bridge cranes, but you can often handle small products manually. Classifying the entire product line into proper categories and establishing the size, shape, and spe-

cial storage or handling characteristics is the first step in distribution design analysis.

#### Inventory profile

The second step is to establish an inventory profile for each product group. This profile will include average and peak levels of inventory for each item in the product group. Express these inventories in units of storage such as number of pallets, bins, or other defined units of measure. Then you can profile the number of loads you need to store by SKU. These item lot sizes will have an impact on which storage modules are most efficient. For example, items with single pallet lots are best stored in single deep pallet racks, while items with lots of 10 pallets or more may be more suitable for bulk floor, push-back racks, drive-in racks, or other deep storage.

#### Movement analysis

In most companies, the 80/20 Pareto rule applies to the movement of material — 20 percent of the SKUs typically account for 80 percent of the movement. Developing a periodic movement profile for each item will allow you to classify all SKUs into categories based on cubic movement (for example, fast, medium, and slow movers). When analyzed properly, this categorization is the basis for determining which equipment you should use as a forward pick module and which items should be slotted in which locations. Faster movers are typically slotted into

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flow racks, pallet flow, or automated pick modules; medium movers can be slotted in carousels or shelving; while the slowest movers may not have forward pick positions or may be located in picking locations farthest from the conveyor line or pick path.

### Order characteristics

The most labor-intensive activities of any distribution operation are the order picking, checking, and packing activities. The efficiency of these operations depends highly on the physical layout of the pick/pack lines and workstations as well as the methods used to pick and pack orders. These layouts and methods are dependent upon the characteristics of the orders received for shipping. There are often many variables in the order characteristics. The number of orders to be shipped per day can vary from day to day or period to period. An order may consist of a single line item or multiple line items. Units per line item may vary from one to many.

Collect and analyze the historical orders for a sufficient time period, such as a year, to develop accurate profiles. These profiles will indicate whether the orders should be picked as single orders, in batches, by zones, or in some combination of these methods. A detailed analysis of the order and movement characteristics will help you determine the amount of space, equipment, and staff required. In addition, the required accumulation in the packing stations as well as the complexity of the packing operations will be greatly influenced by the order profiles.

### Receiving and shipping characteristics

Analyze the DC's receiving and shipping characteristics for efficient dock area design and to determine the number of dock doors and staging space required. Develop profiles, including truck arrival and departure patterns, the number of inbound and outbound shipments, composition of loads in terms of cartons and pallets, and shipment documentation requirements.

### Information analysis

No operation can function efficiently without the proper flow of information, instructions, and documents among the company's staff and its functions. This exchange of information can be as simple as word-of-mouth communication or as sophisticated as communication between workers and the warehouse management system via portable RF devices. The efficiency of most of the physical operations is closely related to the manner in which the information is provided to the workers, the information they must feed back, and the documents they have to handle. A simple example of the importance of this information is when picking documents have items arranged in the sequence in which they are located in the pick line, the picker can perform the task more quickly and efficiently than if he or she has to search for items in a longer travel path than necessary.

One way to perform an analysis of this part of your operations is to develop an information flow chart for each warehouse function. This chart should include the sequence in which information and documents flow, what information is being recorded and by whom, and how this information is distributed. Examine this chart to identify redundancies, steps that could be eliminated, forms that could be eliminated, missing information, and information that can be systems-based rather than manual.

These processes of analysis are not all-encompassing for distribution design. But designing a warehouse or distribution operation is not simply an arbitrary arrangement of racks, bins, and operational areas. An efficient and effective distribution design requires an intelligent understanding of the business and operating needs, achieved through a thorough analysis of your products, orders, inventory, movement, returns, and information.

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