Distribution Center MANAGEMENT

December 2012 Managing people, materials and costs in the warehouse or DC

From the Golden Zone

To design an efficient DC, consider slotting, cubic capacity, docks

by Keith Swiednicki, KOM International

When designing a warehouse facility for efficiency, the goal should always be to minimize costs. This includes both capital costs used to construct a new facility or expand an existing location, as well as ongoing operating costs associated with handling product and maintaining the physical structure.

More than ever, companies are reducing costs to remain competitive, while keeping an eye on further improving their responsiveness to customer demand. In an efficiently designed distribution center, the operating strategy is predicated on the layout concept, while application of the layout concept is determined by the specific warehouse dimensions and existing set of constraints for a given operation.

As such, there is an inherent suitability of certain strategy alternatives over others for any given operation, which is not immediately obvious without a rigorous comparative evaluation of viable alternatives — in regard to both layout concepts and their corresponding operating strategy options.

The goal of efficient DC design is to minimize annual operating costs while maintaining service levels. Keeping in mind that service levels are often affected by efficiency within a warehouse operation and are affected by the design of the layout, and assuming a conventional case pick operation, there are three main factors driving efficient design:

Pick slots

Long selection times can impose a major cost on DCs. The width of pick slots offers one area for improvement. Do you have four-foot wide pick slots where a foot-wide slot would suffice? If multiple locations in your DC fit this description, your pickers are walking or driving farther than they need to.

Assigning an efficient slot type to each unique item in the distribution center should be based on weekly shipping volumes and desired replenishment activity. The trade-off in productivity is pick-line length versus replenishment or restocking activity. In many DCs, picking productivity accounts for up to 60 percent of all direct labor and thus commands the greatest attention.

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Cubic inventory storage

Do you have product and pallets clogging your aisles? Are your operators griping that there's too much product in the DC?

Your DC might be cluttered, but there's only one way to determine if it is full: You must calculate your networking capacity, or NWC.

Once pick slot requirements are determined and converted into rack bays, the cubic inventory on hand will determine the required height of the bays, and thus the entire building size. The NWC is then calculated at varying building heights to ensure that inventory will fit overhead of the pick slots.

In some designs, where inventory levels are very high, special dense storage sections may be added to the DC layout in order to minimize stacking height requirements. Holding inventory for a given item as close as possible to its designated pick location is vital, as this minimizes the amount of putaway and replenishment labor required to stock the pick slot.

Once you know your NWC, you can use this measure to keep your buyers from cramming your warehouse with more inventory than you need.

Dock and dock door requirements

The dock is the heart of any operation. It can create blazing efficiencies or hazardous bottlenecks.

Dock design isn't exactly rocket science. The general rule of thumb: The bigger, the better. That's why the 40-foot dock once common for perishables at food DCs has been replaced by docks of up to 120 feet.

Dock and dock door requirements are driven primarily by shipping or service levels, hours of operation, and number of days per week of operation. The more balanced the workload, the more efficient the design will be. Dock sizes can range from 50 feet to 120 feet in depth, depending on the amount of crossdock or product flow-through on a given operating shift or for required equipment, such as pallet wrapping machines.

Other factors to consider in efficient DC design

Consider secondary items such as building columns, battery charging stations, returns handling areas, and clerical offices. These things don't drive the design, but they should fit in with the main functions of the warehouse.

Another important consideration is flexibility in DC design. Given the changing landscape of supply chain management, a flexible operation is a must. Think ahead to consider expansion planning and "what if" scenarios. Flexibility in equipment choices and the sizing of dock and storage areas will allow easier transition to new operating realities.

Customer-driven implications include factors such as massive stockkeeping unit (SKU) proliferation, product sourcing and packaging issues, and order size. These items must be considered both in regard to flexibility for the future and from the perspective of a "store friendly" layout where appropriate.

As the supply chain moves to a leaner, demand-driven model, the trend is toward less inventory in the system in general. This is a fundamental change from the traditional model, which was essentially an inventory-driven supply chain. And with less inventory in the system, we see that product assortment and the need to effectively handle individual products determines the most appropriate operating strategy upon which efficient DC design is predicated.

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