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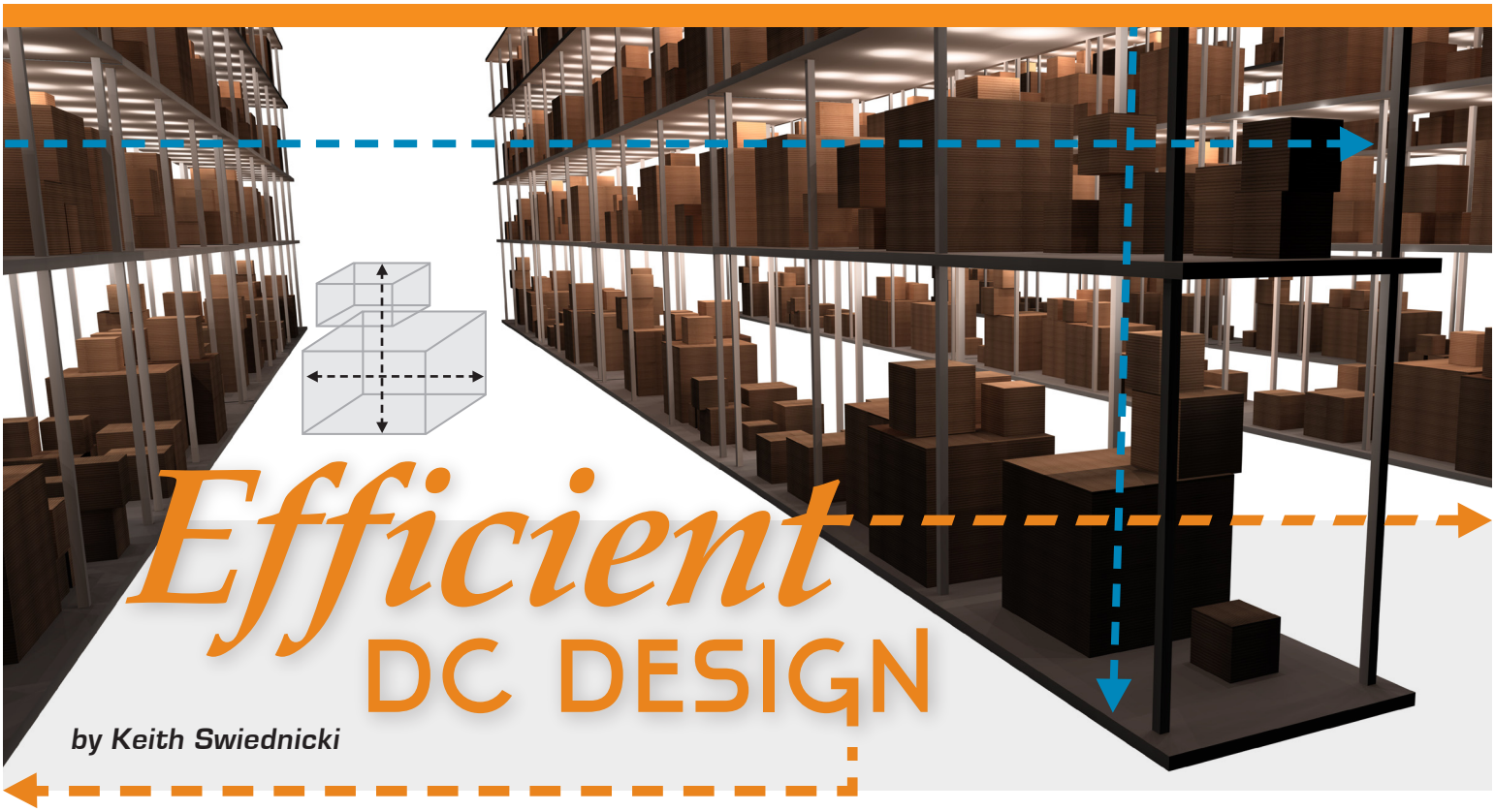


Efficient DC DESIGN

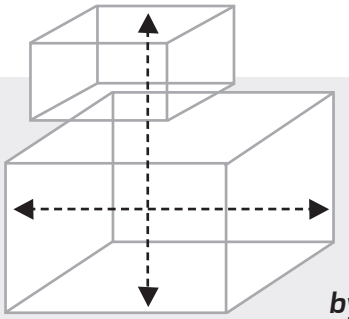
by Keith Swiednicki

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 on-going 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 (DC), 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.

"Efficient DC Design" has as its prevailing objective to minimize annual operating costs while maintaining desired service levels within the parameters of the most appropriate operating strategy. Keeping in mind that service levels are often affected by efficiency within a warehouse operation and are thereby impacted by the design of the layout, and assuming a conventional case pick operation, there are three main factors driving efficient design.



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1. Pick Slots

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% of all direct labor and thus commands the greatest attention.

2. Cubic Inventory Storage

The necessary storage volume is often expressed in terms of cube (ft3). The ability of a DC to efficiently store cube is defined as networking capacity (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(s) is vital as this minimizes the amount of putaway and replenishment labor required to stock the pick slot.

3. Dock and Dock Door Requirements

The dock is the heart of any operation and ultimately creates needed efficiencies or, if inadequate, hazardous bottlenecks. 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 any required equipment such as pallet wrapping machines.

Other factors to consider in Efficient DC Design

Location of auxiliary functions such as building columns, battery charging, returns handling, clerical offices, etc. are items that do not drive the design, but should be considered so that they integrate well and don't interfere 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. Therefore, thinking ahead to consider expansion planning and "what if" scenarios will enhance your DC plan. Flexibility in the equipment chosen and the sizing of dock and storage areas will allow easier transition to new operating realities as required.

Customer-driven implications include factors such as massive stock-keeping unit (SKU) proliferation, product sourcing and packaging issues, order size, etc., and are best considered in your DC plan both in regard to flexibility for the future, and from the perspective of a "store friendly" layout where appropriate.

The principles outlined above for a conventional warehouse operation are similar for nonconventional solutions in that obtaining and evaluating the right data provides an understanding of the footprint required for an efficient DC design and based on the most appropriate operating strategy.

As the supply chain moves to a leaner, demand-driven model, the trend is towards less inventory in the system. This is a fundamental change from the traditional model, which was essentially an inventory-driven supply chain. And, with fewer inventories 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.

by Keith Swiednicki, Senior Partner and Chief Operating Officer, KOM International

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