

Feature: Critical Steps To Distribution Center Planning

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Because these facilities are critical components of the supply chain, they require a detailed planning process to ensure they meet return on investment expectations.

More than ever, the “measure twice, cut once” rule applies, since having to tack on additional capital outlays five, six, or seven years down the road is costly. The projection of inventory and how it is to be stored and moved are the driving factors, as a 20% deviation on a 200,000 square foot storage area can result in a 40,000 square foot shortfall or surplus.

In the final design phase, picking and storage will rule the day; yet they have opposing agendas. Large storage areas increase travel distances and reduce the picking efficiency. On the other hand, the ideal picking operation requires relatively small amounts of product stored in dedicated locations, relatively close to one another, which works counter to a facility’s storage efficiency.

When considering the design and layout of a new distribution center, it’s important to first consider which of the four scenarios most closely resembles your operation:

Low Activity / Low Storage Requirements. This combination represents the simple, smaller warehouse operation. Rarely are automation or sophisticated storage and picking mediums or devices justified for these smaller operations. In most instances, floor storage, stacked pallets, simple pallet racks and/or conventional shelving are utilized within the facility, along with manual handling.

- **Low Activity / High Storage Requirements.** This combination typically calls for high bay, multi-level, high-density storage, and a random location strategy. Order picking can be manual or semi-manual.
- **High Activity / Low Storage Requirements.** This combination generally suggests a very condensed forward picking area supported by simple overstock storage. The high pick activity level often justifies automating the order picking system and the use of automated material handling systems.
- **High Activity / High Storage Requirements.** This combination is characteristic of a typical large distribution center. The high pick activity and high storage requirements often justify the use of exceedingly automated order picking systems, heavily automated material handling and sortation systems and high-density storage.

Once the storage and picking scenario is understood, taking into account economic forecasts (consumer spending habits down in today’s stagnant economy could change over the next few years, and inventory requirements with it), the planning

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process is now off and running.

Keeping in mind that a distribution center may be a company's largest capital investment, as well as the final stop before the product reaches the customer (or doesn't), it's imperative the planning is done perfectly the first time. To accomplish this objective, here are seven critical steps to follow when planning a warehouse or distribution center.

1. Define goals and objectives. These should be closely aligned with the overall strategy for the new facility. They can be defined as minimizing warehousing operating costs, maximizing picking productivity, or simply providing the best customer service. They can also be defined more specifically, such as maximizing cube utilization, providing maximum flexibility in the final layout to accommodate future expansion or changes in business, or maximizing efficiency and productivity with a minimal amount of resources.

2. Document the process. Review the existing or proposed methodology and process, and conduct personal interviews with the staff dedicated to all major functional areas within the process. Recent changes in the economy may have caused some downsizing and movement of personnel to work areas they may not be totally familiar with, so be sure to interview enough people familiar with each functional area. If those interviewed can't identify areas of opportunity for improvement in their department or area, you should look to interview more from that department or functional area as there is always room for improvement.

3. Collect information and data. Collect any and all information specific to the new facility. Since it is best to work from inside the facility out when considering new construction, don't let any building constraints restrict design. When considering existing space for the new facility, make sure the information includes accurate drawings showing column sizes and locations, dock and personnel doors and locations, ceiling height restrictions, and ceiling girder/joist construction. It is also important to collect all relevant product information pertaining to the number of stock keeping units (SKUs) to be stored and picked within the facility, along with their dimensional measurements, weights, order history, and velocity data.

4. Analysis. Once information about the building and the inventory has been collected, a thorough analysis should be performed in order to determine if the goals and objectives can be obtained. The analysis should answer the following questions:

- How well does the product flow into, within, and out of the facility?
- Does the forward pick area (pick modules) hold sufficient inventory to avoid excessive replenishment requirements?
- Is the storage system and area large enough to accommodate the inventory including any required safety stock?
- What type of conveying and sortation equipment will be used?
- What are the staffing requirements?
- Does the operating budget include staffing, maintenance, utilities and the

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cost of the information system?

- How well will the facility adapt to a change in operating requirements?
- How effectively will the warehouse management system work with the automated material handling system?

If the analysis determines the goals and objectives can be met, the detailed solution and project plan can then be developed. If they cannot be met, then management should determine an alternate plan of action such as modifying the goals and objectives or making substantial changes to the building design.

5. Create a detailed project plan. This plan should identify all the steps required to create the warehouse or distribution center layout, including the overall goals and objectives, and the results of the information and data analysis used in developing the plan. The project plan should contain the major tasks to be undertaken, the resources needed to achieve each task, and how much time should be allotted to accomplish the tasks successfully.

The project plan should include start and end dates for all tasks, as well as availability of resources. Once the plan has been developed, it should be reviewed and checked to be sure the timeline is realistic and attainable, as the available occupancy date of a new facility will dictate equipment delivery and installation.

6. Implementation. The implementation phase of the project is when the “rubber meets the road.” It’s during this phase that the layout is transformed from concept to reality. All resources within the new facility need to work together to ensure the project plan’s goals are met. Since there is a set order in which components of the system should be installed, delivery of all products is carefully coordinated so as to arrive at the time when it is needed.

Like a race car which is tuned to perform its best at each individual race track, this phase is when the system gets tuned for peak performance. Timing for the sortation systems and merges are set to maximize throughput. The pitch to be used for the carton and pallet flow racks is adjusted in order to meet the user’s satisfaction.

The time from establishing system goals to completion can in some cases be over a year and, on occasion, changes are requested during the implementation phase in order to meet the most current objectives. It’s important to remember that all of these changes or deviations from the original plan must be well documented so that expectations for all stakeholders are managed properly.

7. Post project review. Once the project has been completed and inventory is moving smoothly in and out of the facility, a closeout meeting should be scheduled. This session will include a discussion with the implementation team as to whether the final layout was implemented as originally designed and approved, and to confirm that any changes were appropriately documented. This step is critical for future project planning.

A well-designed and well-planned warehouse or distribution center offers multiple advantages in the fight to remain competitive and successful. By taking the

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necessary steps to see the project through from start to finish, the result will be a facility that operates efficiently, uses space effectively, maintains cost control, and in the end achieves its ultimate goal of meeting expectations.

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